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Dedication

Allah the all merciful, I beg thee to accept this effort for the soul of my father
He was your gift for me

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Introduction

Classifications of nervous system

- Functional classification (Neurophysiology) :
 - ✓ Motor
 - ✓ Sensory
 - ✓ Psychological
- Structural classification (Neuroanatomy) :
 - ✓ Central
 - ✓ Peripheral

Neuroanatomy

The nervous system is classified into :

1. Central Nervous System (CNS)
2. Peripheral Nervous System (PNS)

Central Nervous System (CNS)

A. Brain :

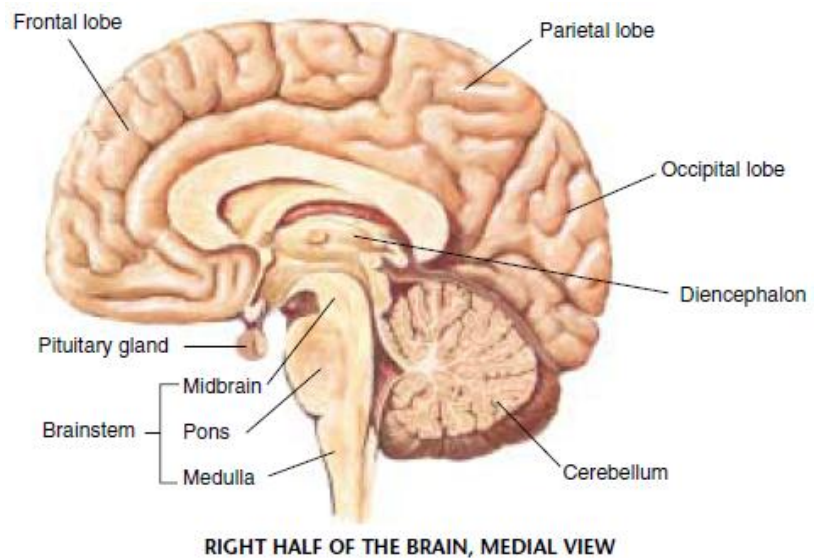
- a) Cerebrum
- b) Cerebellum
- c) Brain Stem :
 - ✓ Midbrain
 - ✓ Pons
 - ✓ Medulla oblongata
- d) Diencephalon

B. Spinal Cord (31 Segments) :

- 8 Cervical
- 12 Thoracic
- 5 Lumbar
- 5 Sacral
- 1 Coxygeal

N.B.

- ✓ *Conus* : last 3 segments
- ✓ *Epiconus* : 4 segments above conus.



Peripheral Nervous System (PNS)

A. Cranial nerves

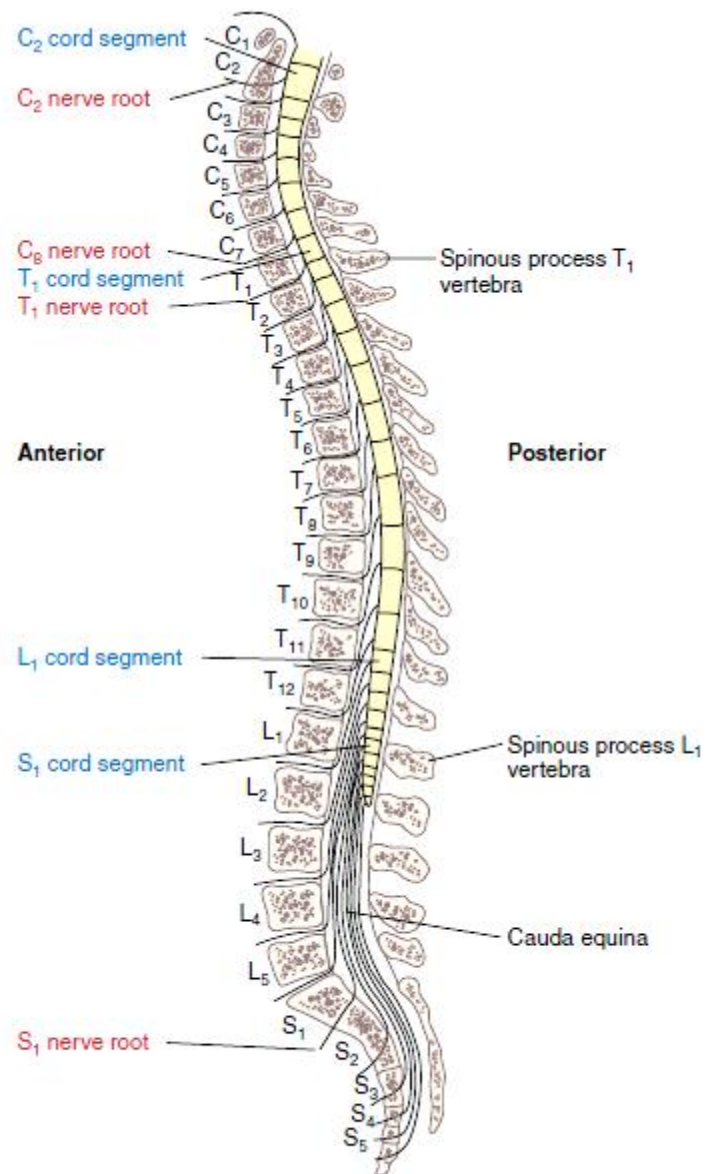
- Number : 12 pairs
- Origin : brain & its stem
- Exit : skull
- Supply : head and neck

B. Spinal Nerves :

- Number : 31 pairs
- Origin : spinal cord
- Exit : vertebral column
- Supply :
 - ✓ Cervical : upper limb
 - ✓ Thoracic : trunk
 - ✓ Lumbar : lower limb
 - ✓ Sacral : lower limb
 - ✓ Coxygeal : perineum

N.B.

- ✓ *Cauda equina : last 10 spinal nerves (lumbosacral) because spinal cord is shorter than vertebral column*



THE SPINAL CORD, LATERAL VIEW

Upper and Lower motor neurons (U.M.N and L.M.N.)

	U.M.N. = Pyramidal tract (Δ) + Extra-pyramidal tracts.	L.M.N.
Consist of	<p><u>Pyramidal tract (Δ)</u> <u>Cortico spinal tract</u>: from cerebral cortex to the anterior horn cells (AHCs) which present in the spinal cord. <u>Corticobulber tract</u>: from cerebral cortex to cranial nerves nuclei which present in the brain stem.</p>	<p>From <u>AHCs to the effector muscles</u>: AHCs \rightarrow roots \rightarrow P.N. \rightarrow neuromuscular junction \rightarrow muscles. Or from <u>cranial nerves nuclei to the effectors muscles</u>: Cranial nerves nuclei \rightarrow cranial nerves \rightarrow neuromuscular junction \rightarrow muscles.</p>
Functions	<ol style="list-style-type: none"> 1. Initiate the voluntary movements. 2. Inhibits AHCs. 3. Skillful movements . 4. Control the sphincters (micturition and defecation). 	<ol style="list-style-type: none"> 1. Perform the voluntary movements. 2. Vitality of muscles & their surrounding structures (skin - hair - nails).

N.B.

- Superficial reflexes take facilitator fibers from both U.M.N. & L.M.N. so, they are absent in both U.M.N.L. & L.M.N.L
- In lower motor neuron lesion absent at the level, while in upper motor neuron lesion absent below the level (as abdominal reflex).

Comparison between upper motor neuron lesion and lower motor neuron lesion

	U.M.N.L	L.M.N.L.
1. Weakness	<u>Paresis</u> <u>Distribution</u> : <ul style="list-style-type: none"> • Distal > proximal. • Abductor > adductor. • Progravity > antigravity. 	<u>Paralysis</u> <u>Distribution</u> : later
2. Tone	<u>Hypertonia</u> (no inhibition of AHCs). <u>Distribution</u> : <ul style="list-style-type: none"> • Adductor > abductor. • Antigravity > progravity. 	<u>Hypotonia.</u>
3. Reflexes	<ul style="list-style-type: none"> ☒ Superficial: absent (below level). ☒ Deep: hyper reflexia. ☒ Pathological reflexes: ± . ☒ Clonus: ± . ☒ Planter reflex: dorsiflexion. 	<ul style="list-style-type: none"> ☒ Superficial: absent (at level). ☒ Hypo reflexia. ☒ Planter flexion or absent (equivocal).
4. Wasting	Absent: may present as disuse atrophy (late - mild - diffuse).	Present (early - marked - localized).
5. Trophic changes	Absent	Present
6. Fasciculation	Absent	Present (irritation of AHCs)

N.B.

- ***Pathological reflexes:*** reflexes which are normally absent, and if present indicate U.M.N.L., as adductor, patellar and finger flexion reflexes.
- ***Clonus:*** rhythmic contraction of the muscles after sudden sustained stretch of the tendon. If present indicate severe U.M.N.L. as (wrist and ankle clonus).
- ***Fasciculation:*** an oscillatory movement of the muscles caused by an irritating lesion of the AHCs.

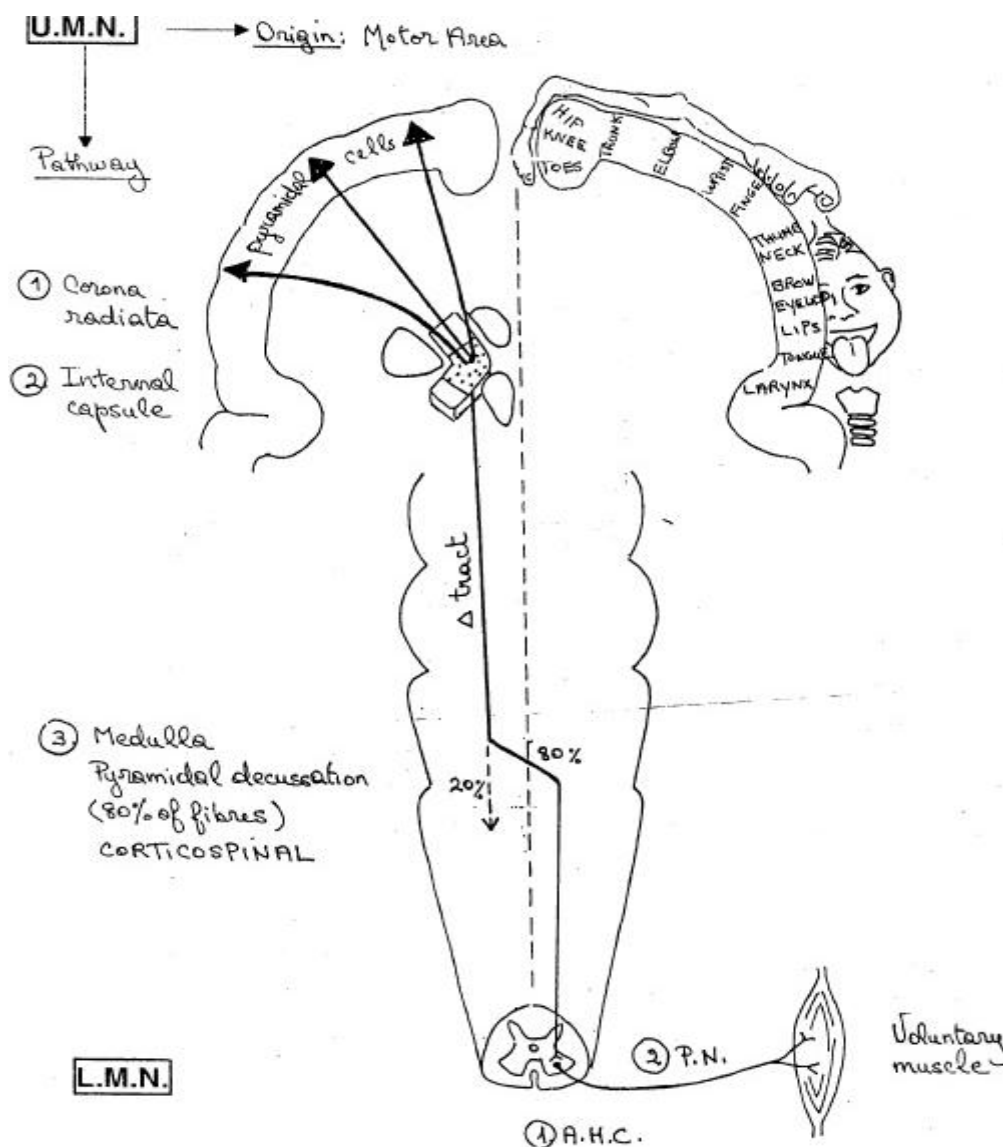
ملاحظات بسيطة

1. في ال paresis بتاع ال upper motor neuron lesion ال proximal والأ distal الأثنين تعبانين " affected " بس ال distal بيكون affected أكثر من ال proximal وكذلك نفس الموضوع في ال abductor وال adductor الأثنين بيكونوا affected ,, بس ال abductor بيكون affected أكثر
عشان كده تلاقي المريض يحط رجل على رجل عادي بال adductor ,, ويشيل رجله بإيديه عشان دي بال abductors
2. لو شوفت clonus ,, متفكرش ,, علطول دي severe upper motor neuron lesion
3. لو دخلت على عيان وعملتله ال deep reflexes ,, لو لقيت ال reflex كان hypo أو Normal ,, أوعى تعمله أو تدور على ال pathological reflexes ,, إلا إذا عملته على أساس إنك بتوري الدكتور ال technique بتاعه .
4. ال fasciculation المقصودة في الجدول السابق دي ال pathological
عشان فيه fasciculation بتحصل physiological زي ليلة الإمتحان وهكذا ,, مش دي موضوعنا هنا .

N.B.

Causes of Fasciculation :

- ✓ Motor neuron diseases
- ✓ Thyrotoxicosis
- ✓ Cervical spondylosis
- ✓ Syringomyelia
- ✓ Acute poliomyelitis
- ✓ Metabolic :
 - Severe hyponatremia , severe hypomagnesemia
- ✓ Drugs (Clofibrate, lithium, anticholinesterase & Salbutamol)



pathway on upper & lower motor neuron system

Relation between vertebrae & spinal cord segments is summarized in the following table:

Vertebrae	Spinal cord segments
Cervical	
✓ 1 - 3	✓ +0
• 4 - 7	• +1
Thoracic	
✓ 1 - 6	✓ +2
• 7 - 12	• +3
L₁ or below	Cauda equina lesion

خلي بالك,, لو ال lumbo sacral انضرب,, ده lower motor neuron lesion

Neurological sheet

Don't forget talk about

1. History: which include
 - Personal history.
 - Complaint.
 - History of present illness :
 - ✓ Analysis of the complaint
 - ✓ symptoms of the related system
 - ✓ other systems
 - ✓ investigations and treatment
 - Past history.
 - Family history.
2. Examination :
 - General.
 - Local.
3. Investigations.
4. Treatment.
5. Diagnosis.

History

Personal history

1. **Name**: to be familiar with the patient.

اسم حضرتك إيه ???

2. **Age**: as certain diseases are more common in certain ages, e.g.

عندك كام سنة ???

- First decade:
 - ✓ Fredrich's ataxia.
 - ✓ Duchen's myopathy.
- Second decade:
 - ✓ Hereditary spastic ataxia.
 - ✓ Baker's myopathy.
 - ✓ Peroneal muscle atrophy.
- Third and fourth decade:
 - ✓ Multiple sclerosis.
- Fifth and sixth decade:
 - ✓ Cerebrovascular strokes.

3. **Sex**:

- Motor neuron disease (M.N.D.) is common in males.
- Migraine is more common in females.

4. **Occupation**: persons in certain occupations are more susceptible to certain diseases e.g. disk prolapse is more common in drivers while lead neuropathy is commoner in printers.

بتشتغل إيه ???

5. **Marital state**: for possible sterility or impotence.

متزوج ??? متزوج من إمتى ??? عندك أولاد ??? كام ولد ??? أصغرهم عنده كام سنة ???

6. **Residence**: e.g. migraine is commoner in urban areas, while nutritional diseases are commoner in rural areas.

ساكن فين ??? مولود وعایش طول عمرک هناك ???

7. **Special habits**: e.g. alcohol can lead to peripheral neuropathy, tremors, amnesia & confabulation (Korsacov's syndrome).

بتدخن ??? كام سيجارة في اليوم ?? بقالك كام سنة ??? بطلت في خلال هذه الفترة ??? بطلت ليه ???
بتشرب خمر أو مخدرات ??? بطريقة منتظمة ولا في المناسبات ?? نوع الخمر إيه ???

8. **Handedness**: in right handed people the dominant hemisphere is the left.

بتستخدم إيدك اليمين أحسن ولا الشمال ???

N.B.

- Left handed peoples:
 - ✓ 1/3 → dominant left hemisphere.
 - ✓ 1/3 → dominant right hemisphere.
 - ✓ 1/3 → bilateral.

Complaint

On patient own words + duration

إيه اللي تاعبك ؟؟؟ إيه اللي جابك المستشفى ؟؟؟
(خلي بالك ,, افرض العيان قالك إنه عنده شلل في الجانب اليمين من جسمه من أربع سنين)
ده مش complaint ,, فإنت تسأل المريض إيه اللي جابك بردو المستشفى ؟؟ هل حصل مثلاً deterioration في الحالة
هل حصل مضاعفات زيادة أو مشاكل تانية فدي اللي جابته المستشفى ,,
(أو جاي عشان الإمتحان أو جاي متابعة) فلازم تكون واخد بالك من ال complaint ده الشيء اللي خلاه يروح المستشفى)

History of present illness (H.P.I.)

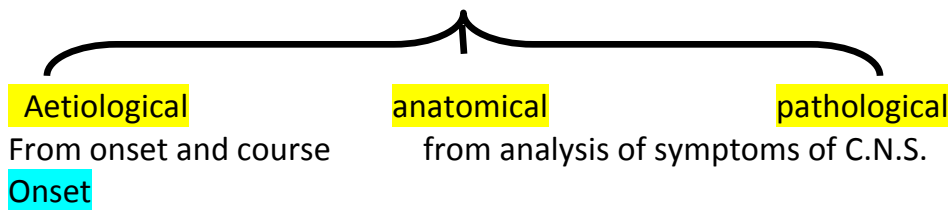
1. Analysis of complaint.
2. Symptoms of the related system.
3. Other systems.
4. Investigation & treatment (related diseases).

Characterized by:

- As long as possible
- Contains medical terms
- In chronological arrangement
- In the form of a story.

1. Analysis of the complaint

History of present illness is highly diagnostic in C.N.S.



Onset

الشكوى دي ظهرت فجأة ولا بعد أد إيه ???

- From beginning of symptoms until the establishment of the disease.
- It may be acute (less than 14 days) or gradual (14 days or more).

Acute onset:

- ✓ **Seconds: Dramatic** e.g. embolus or trauma.
- ✓ **Minutes: Apoplectic** e.g. hemorrhage.
- ✓ **Hours: Sudden** e.g. thrombosis.
- ✓ **Days < 14 days: Rapid** e.g. inflammation.

N.B.

- *Trauma can be easily excluded from history (no history of trauma).*
- *Inflammation is associated with fever, headache and malaise.*

Gradual onset:

- ✓ In degenerative diseases as diabetic P.N. or space occupying lesions (S.O.L.) as tumors.

Course

الأعراض ظهرت بالتدريج ولا على مدى أسابيع وشهور ??? أو بتحدث في نوبات ???

- From the establishment of the disease until recovery or complications.
- It may be progressive, regressive, stationary, remittent or intermittent.
 - ✓ **Remittent:** in attacks, patient in between attacks is diseased as multiple sclerosis.
 - ✓ **Intermittent:** in attacks, patient in between attacks is healthy (symptoms free) as epilepsy & migraine.
 - ✓ Acute onset is always followed by **regressive** course while gradual onset followed by **progressive** course.

2. Symptoms of C.N.S. (T.N.M. + 3 Ss)

1. Symptoms of increased intracranial tension. (↑ I.C.T.).
2. Cranial nerves symptoms.
3. Motor system.
4. Sensory system.
5. Sphincter troubles.
6. Speech troubles.

1. I.C.T.

هل عندك صداع مستمر لا يستجيب للمسكنات ؟؟؟ هل حدث لك قيء ؟؟ هل عينك زغللت ؟؟؟

Bursting headache, projectile vomiting, blurring of vision ± coma, ± convulsions.

2. Cranial nerves

See later.

3. Motor system.

- a. Weakness.
- b. Involuntary movement.
- c. Co-ordination.

a. Analysis of weakness (13 points) (onset, course, duration + 5 character + 5 distribution)

5 characters

1. Degree.؟؟؟ اللي عندك ضعف ولا شلل
2. Tone.؟؟؟ عضلاتك سايبية ولا مخشبة ؟؟؟ شدت عليك من البداية ولا بعد المرض ما حصل بشوية ؟؟؟
3. Wasting (onset - degree).؟؟؟ هل عضلاتك خست ؟؟ ولا حجمها عادي ؟؟؟
4. Trophic changes.؟؟؟ هل أظافرك بتتقصف ؟؟؟
5. Fasciculation.؟؟؟ هل عندك رفة في عضلاتك ؟؟؟

5 distribution

1. U.L. / L.L. or both.؟؟؟ إيدك ولا رجلك ؟؟ ولا الأثنين ؟؟؟
2. Right / left or both.؟؟؟ يمين ولا شمال ؟؟ ولا الأثنين ؟؟؟
3. Proximal or distal.
 - تعرف تعصر الليمونة أحسن ولا تسرح شعرك ؟؟؟ Upper limb.
 - تطلع السلم أحسن ولا تلبس الشبشب ؟؟؟ Lower limb.
4. Abductor or adductor.
 - تلبس الجاكت أفضل ولا تضع كتاب تحت باطك ؟؟؟ Upper limb.
 - تحت رجل على رجل ولا تشلها أسهل ؟؟؟ Lower limb.
5. Flexor or extensor.
 - إيه أسهل ,, تفتح الدرج ولا تقفله ؟؟؟ Upper limb.
 - تلبس البنطلون ولا تفرد رجلك فيه أسهل ؟؟؟ Lower limb.

b. Involuntary movements (13 points) (onset, course, duration + 5 character + 5 distribution).

هل عندك حركات لا إرادية؟؟ فين؟؟ يمين ولا شمال؟؟ إيدك ولا رجلك؟؟

5 characters

1. **Static or kinetic.**؟؟؟ بتظهر أكثر مع الحركة ولا مع السكون
2. **Regular or irregular.**؟؟؟ منتظمة ولا غير منتظمة
3. **Tone.**
4. **Increased by.**؟؟؟ بتزيد بإيه
5. **Decreased by.**؟؟؟ بتقل بإيه

5 distribution

1. **U.L. / L.L. or both.**؟؟؟ في إيدك ولا رجلك
2. **Right / left or both.**؟؟؟ يمين ولا شمال
3. **Proximal or distal.**؟؟؟ ناحية الجسم ولا بره
4. **Head and neck.**؟؟؟ فيه هزة في رأسك أو رقبتك
5. **Trunk.**؟؟؟ فيه حركات لا إرادية في جسمك

c. Co-ordination

1. Cerebellum

Upper limb	lower limb
<u>Shaking movement Or, tremors during eating</u> ؟؟؟ لما بتأكل الأكل بيوصل لفمك	<u>Drunken gait.</u> ؟؟؟ بتمشي طبيعي ولا بتتطوح زي السكران

2. Deep sensation

Upper limb	Lower limb
	<u>Falling while closing eyes</u> ؟؟؟ لو غمضت عينيك وأنت بتغسل وشك بتقع

4. Sensory system

Types of sensation

1. Thalamic

Superficial	Deep
<ul style="list-style-type: none"> • Pain. • Touch. • Temperature. 	<ul style="list-style-type: none"> • Position. • Movement. • Vibration. • Muscle tone. • Nerve sense.

2. Cortical

e.g. stereognosis

superficial sensation
onset, course, duration

character

Distribution

Sites e.g. Gloves & Stokes Sensory P.N.

Irritation ؟؟؟ هل عندك تنميل أو شكشكة	Destruction ؟؟؟ هل الإحساس قل أو اختفى
<ul style="list-style-type: none"> • Pain. • Parasthesia. <ul style="list-style-type: none"> ✓ Tingling. ✓ Numbness. 	<ul style="list-style-type: none"> • Hypoesthesia. • Anaesthesia.

Deep sensation: the patient feels as he is walking on a cotton.

Cortical sensation: the patient recognize familiar things without seeing them.

Radicular, root or girdle pain (with dermatome)

Special type of pain in neurology.

- ↑↑ by cough and straining.
- ↓↓ by rest and support.

Value

- Paraplegia (leveling).
- Cauda equine.

5. Sphincter troubles

Micturation, defecation and sexual function.

Centre: autonomic center ($S_{2,3,4}$)

هل عندك مشاكل في التبول ؟؟؟؟ بتتبول على نفسك ؟؟؟ البول يسبقك قبل ما تدخل الحمام ؟؟؟ البول بيتأخر لما بتدخل الحمام وبيطول على بال ما بينزل ؟؟؟ هل عندك مشاكل في المعاشرة الزوجية ؟؟؟ أخبار الإنتصاب الصباحي إيه ؟؟؟ بتأخذ أدوية ؟؟؟

Micturation (neurogenic bladder)

A. L.M.N.L.

- Afferent lesion → painless retention (sensory atonic bladder).
- Efferent lesion → painful retention (motor atonic bladder).
- Afferent and efferent or center → autonomic bladder (incomplete, irregular and involuntary evacuation).

نفرد شوية في الموضوع

ال bladder فيها منطقة ال trigone
اللي فيها :

- Stretch receptor
- Chemical receptors

وال stretch receptors دي sensory بالطبع ,, وبتبعت afferent لل center رقم $S_{2,3,4}$

لما ال bladder تتملي

يقوم ال center ده باعت " Motor " لل bladder عشان تفضى
والعملية دي بيحصلها control على أعلى مستوى " اللي هو ال cortical في ال para central lobule "

ال $S_{2,3,4}$ Center يأخذ رأي ال center الموجود فوق في ال cortex
ويشوف الظروف مناسبة عشان يحصل micturation ولا لا

في ال lower motor neuron lesion

ممکن ينضرب حاجة من ثلاثة
إما ينضرب :

- Afferent اللي بيبتعت sensory من ال bladder لل $S_{2,3,4}$ center .
- Efferent اللي بيبتعت motor من ال center إلى ال bladder .
- ال afferent وال efferent أو ال center

لو ال afferent انضرب ,,

ال bladder هتفضل تتملي وال center مبيوصلوش أي sensory ولا حاسس بال bladder خالص
هيجصله retention of urine بدون ألم
ولكنه can micturate
هذا الشخص هيجصله حاجة من اتنين :
1. يفكر إنه يعمل micturation

2. ميفكرش إنه يعمل micturation ,, فال pressure هيعلى أوووي وال sphincter تفتح ,, وهتلاقيه بينقط وبعدين يدخل الحمام يفضي .
 ده يعمل back pressure ,,
 يقوم عامل hydroureter و Hydronephrosis
 وممكن يبوّظ ال Kidney

لو ال efferent انضرب ,,

يبقا ال center عمال يوصله sensory وحاسس بال bladder
 بس ال Motor مش شغال
 فهتلاقي فيه painful retention of urine
 فهيروح للدكتور يركبه أسطرة
 وكُتب على هذا المريض إنه يمشي بالأسطرة

اللي ينضرب عند ال afferent و ال efferent أو ال center

ده مبيوصلوش أي sensory من ال bladder
 ولا ال center عارف يوصل أي Motor لل bladder
 فهتلاقي المريض ده مش حاسس ولا عارف يفضي

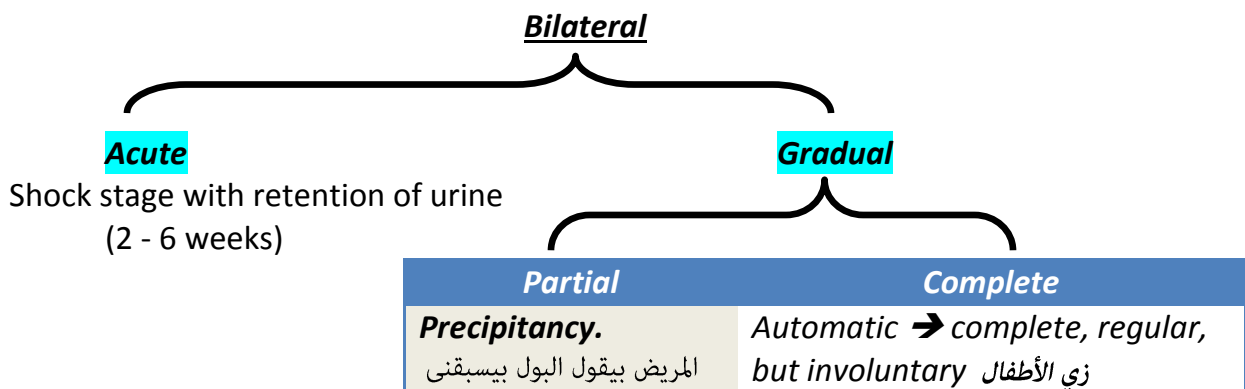
يبقا نقول مجملة كده :

- اللي ينضرب عنده ال afferent ميحسش بس يعرف يفضي.
- اللي ينضرب عنده ال efferent يحس بس ميعرفش يفضي .
- اللي ينضرب عنده الأثنين ,, لا يحس ولا يعرف يفضي .

B. U.M.N.L.

- Unilateral.
- Bilateral.

Unilateral → nothing (as center is bilaterally supplied by Δ tract).



في ال upper motor neuron lesion

ممکن يكون ال Lesion :

- Unilateral
- Bilateral

لو ال Lesion كان unilateral

مفیش حاجة هتتأثر في ال bladder

عشان ال bladder جايلها supply من ال pyramidal tract من على الناحيتين

لو ال Lesion كان bilateral

هنشوف ال lesion الي حصل ده كان acute ولا gradual

لو acute ,, هيدخل العيان في ال shock stage

ودي بتقعد من أسبوعين إلى ست أسابيع according to general condition of the patient

لو ال general condition بتاعت العيان كويسة ,, الوقت ده هيفل

وده good prognosis

بيحصل فيها retention with over flow

لو gradual ممكن يكون

- Partial lesion
- Complete lesion

لو partial هتلاقي عند العيان حاجة مهمة أوووي اسمها ال percipitancy

المريض يقولها : إن البول بيسبقني

ودي مهمة جداً لأنها قد تكون الدليل الوحيد من ال History على ال bilateral upper motor neuron lesion

لو complete

ال bladder هترجع زي ال bladder بتاعت الأطفال

وقت ما تتملي ,, تقوم مفضية نفسها

ال S_{2, 3, 4} center الي شغال بس

وتُسمى automatic bladder ,, الي بتكون مواصفاتها :

- Regular
- Complete
- Involuntary

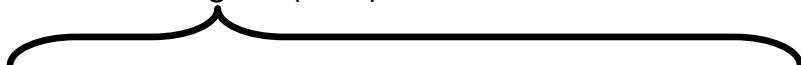
Erectile dysfunction (Impotence)

Inability of male to maintain an adequate erection sufficient for satisfaction of his female partner.

May be partial or complete.

Causes

- a. Psychogenic (30 %)
- b. Organic (70 %)



Iatrogenic	Vascular	Neurogenic
B-blocker.	Le Riche Syndrome.	P.N.

Approach for diagnosis of impotence:

1. Ask about sexual function.
2. Ask about morning erection.
 - If absent → organic.
 - If intact → psychogenic.
3. Drugs history (anti hypertensive drugs) for iatrogenic organic impotence which is reversible.
4. Testicular sensation which is absent in neurogenic impotence but intact in vascular causes.

N.B.

- **Le Riche syndrome:** Aorto-iliac block with occluded both internal iliac arteries → occlusion of median sacral artery which supplies nerve erigent ($S_{2,3}$) which is responsible for erection.

6. Speech troubles هل عندك مشاكل في الكلام ؟؟؟

There is speech troubles or no without details.

3. Other systems

Other systems متنساش الخطوة الثالثة
 هتسأل بقا سؤالين في ال cardio على ال Pulmonary congestion وال systemic congestion
 manifestation بتاعت ال low cardiac output وال syncope
 الحاجات الكبيرة دي بتسألها على السريع
 بالنسبة لل chest وال abdomen بتسأل عن الحاجات الكبيرة
 يعني مش بالتفصيل الممل
 ولو مفيش فيها أي حاجة
 no symptoms suggest other systems affection
 وتكتبها كده بيقا انت سألت عليها
 عشان محدش يجي يقولك أنت مسألتش على ال Other systems ليه !!!!

Vaules of C.V.S. history and examination in C.N.S.

Cause	Result	Association
<ul style="list-style-type: none"> Mitral stenosis may be complicated by atrial fibrillation which causes embolic hemiplegia. Hypertension may cause thrombotic hemiplegia. 	Silent myocardial infarction in diabetic P.N.	Herdiofamilial ataxia and myopathy may be associated with cardiomyopathy.

Value of respiratory system history and examination in C.N.S.

Cause	Result
T.B. → pott's disease which cause extramedullary compressive paraplegia.	Static pneumonia in patients with prolonged rest in bed as patients in shock stages.

Causes of fever in C.N.S.

- Meningitis.
- Encephalitis.
- Encephalomyelitis.
- Poliomyelitis.
- Peripheral neuritis.
- Myositis.
- Subarachnoid hemorrhage (low grade).

4. Investigation & treatment (related diseases)

اللي إنتوا بتضيعوا فيها بدون مبالغة عشر دقائق
وهي في الآخر تسوى إيه ؟؟؟ تسوى ولا حاجة

لو نستها ممكن تعدي
إحنا مش هننساها إن شاء الله ومش هنضيع فيها وقت
متفعدش تقولي العيان راح فين وجه منين ؟؟؟
تقولي :

Patient sought medical advice

admitted فين ؟؟؟

recommended إيه ؟؟؟

وعملوا إيه ؟؟؟

وخرج من المستشفى

واتحجز في المستشفى الفلاني

وبعدين اتحجز في الثاني وبعدين مش عارف

إحنا ملنا بالكلام ده !!!!!!!

أنا عايز جملة واحدة

patient investigated by CT, MRI, MRI with diffusion

وهكذا,,

and treated by clexan etc...

خلاص أنا مش عايز حاجة ثانية

أنا عايزها كده جملة في الآخر

متفعدش تفتح في حكاوي العيان ,, لازم تلجم كده العيان في الامتحان

وإلا مش هنخلص يعني ماشي ☺

Past history

- Similar attacks.
- Chronic diseases as D.M., hypertension, T.B.,
- Major operations (complications of general or spinal anesthesia).
- blood transfusion.
- Drug allergy and intake:
 - ✓ P.N. → caused by isoniazide.
 - ✓ Myopathy → caused by steroids, chlorquine and vincristine.
 - ✓ Ataxia → caused by phyntoin (toxicity).

أخذ تاريخ للأمراض المزمنة

Diabetes Mellitus أول مرض ال

- عندك سكر ؟؟ من إمتى ؟؟ أخذت علاج إيه ؟؟ جرعتة أد إيه ؟؟ آخر تحليل سكر كان كام ؟؟ حصل أي مضاعفات ؟؟؟

ثانياً مرض الـ Hypertension

- عندك ضغط؟؟ من إمتى؟؟ أخذت علاج إيه؟؟ جرعته أد إيه؟؟ آخر مرة قياست الضغط كان كام؟؟ حصل أي مضاعفات؟؟

ثالثاً مرض الـ T.B.

- جالك زمان كحة ودم وبلغم؟؟ كنت بتسخن لبيل وتبل الملاية عرق؟؟ اتحجزت في مستشفى الصدر وأخذت علاج لفترات طويلة؟؟

رابعاً مرض الـ Hepatitis

- لو عينيك بقا أصفر؟؟ لون البول اتغير؟؟ رحت الحميات؟؟

خامساً مرض الـ D.V.T.

- رجلك ورمت ووجعتك؟؟؟ حجزوك في المستشفى قبل كده وأدولك مسيلات للدم؟؟

تسأل عن الـ Major operations

- عملت عمليات جراحية قبل كده؟؟ عملية إيه؟؟؟ من إمتى؟؟ حصل بعدها مضاعفات أو تلوث في الجرح؟؟؟

تسأل عن الـ Drug intake (INH, steroid, Barbiturates)

- بتأخذ أدوية بصفة مستمرة؟؟؟ عندك حساسية من أي دواء؟؟؟

تسأل عن الـ Fever

- هل جت لك حمّة قبل كده؟؟ استمرت معاك كام يوم؟؟؟

تسأل عن الـ Trauma

- عملت حوادث قبل كده؟؟ أو أصبت إصابات في جسمك أو رأسك أو العمود الفقري؟؟؟

تسأل Similar attack

- هل جت لك الحالة دي قبل كده؟؟ أو حدثت لك؟؟

Family history

Very important as Ferdrich's ataxia (autosomal recessive),
Hereditary spastic ataxia & peroneal muscle atrophy (autosomal dominant)
Pseudo hypertrophic myopathy (X-linked).

حد في العائلة اشتكي من نفس الشكوى؟؟؟ الأب والأم قرايب؟؟؟

Examination

Don't forget Examination :

- General
- Local

10 Steps

1. General examination.
2. Mentality.
3. Speech.
4. Cranial nerves.
5. Motor system.
6. Reflexes.
7. Sensory system.
8. Back.
9. Gait.
10. Other systems

1. General examination.

As usual

A أرقام	• Blood pressure, pulse, Respiratory rate, Temperature and Blood sugar
B	• B uilt ✓ Under built or over built
C	• C omplexion : pallor, jaundice and cyanosis
D	• D ecubitus
E	• Neck vein – H & N (total) حافة فوق
	• Clubbing (upper limb) حافة في النص
	• Flapping tremors in respiratory failure (CO ₂ retention).
F	• Lower limb edema (lower limb) حافة تحت
	• Mentality "فكر"
	✓ Disturbed level of consciousness (see later)
	• Face + general look.

2. Mentality

- a. Consciousness level (fully conscious, semi conscious or comatosed).
- b. Orientation (time, place and persons).
- c. Mood (average, depressed, euphoric).
- d. Memory (old and recent).
- e. Behavior (co-operative or not).
- f. Intelligence

Diagnosis of coma: see written notes.

Glasgow Coma Scale (GCS)

This is an objective score of consciousness. Repeated testing is useful for judging whether coma is deepening or lifting. There are three categories.

Note that the lowest score in each category is 1, meaning that the lowest possible GCS = 3 (even if the patient is dead).

- **Eye opening (max 4 points)**
 - ✓ Spontaneously open 4
 - ✓ Open to (any) verbal stimulus 3
 - ✓ Open in response to painful stimulus 2
 - ✓ No eye opening at all 1
- **Best verbal response (max 5 points)**
 - ✓ Conversing and orientated (normal) 5
 - ✓ Conversing but disorientated and confused 4
 - ✓ Inappropriate words (random words, no conversation) 3
 - ✓ Incomprehensible sounds (moaning, etc.) 2
 - ✓ No speech at all 1
- **Best motor response (max 6 points)**
 - ✓ Obeying commands (e.g., “raise your hand”) 6
 - ✓ Localizing to pain (moves hand toward site of stimulus) 5
 - ✓ Withdraws to pain (pulls hand away from stimulus) 4
 - ✓ Abnormal flexion to pain (decorticate posturing) 3
 - ✓ Abnormal extension to pain (decerebrate posturing) 2
 - ✓ No response at all 1

Example: The patient is fully conscious, well oriented to time, place and persons, with good mood and memory, he is co-operative with an average intelligency.

3. Speech

Communication with others via verbal, writing or movement.

Speech disorders:

- a. **Formulation:** aphasia or dysphasia
 - Sensory (auditory and visual)

- Motor:
 - ✓ verbal → Broca's area (44) expressive aphasia.
 - ✓ Writing → Exner's area (45) agraphia.

وعشان تفتكر الموضوع ده كويس بتاع area 44 و area 45

خد ال hint ده ☺

Area 44

عارفين أم أربعة وأربعين ؟؟؟؟

عارفينها ولا لا ؟؟؟؟؟ الحشرة اللي لدعتها والقبر

ال Female بردو لدعتهم والقبر

ال female بيدلغوا إزاي ؟؟؟؟ بلسانهم

فأربعة وأربعين دي مسؤولة عن ال speech

وتبقا واخدة ال frontal lobe كله في ال females

هي مسؤولة عن إنك تعبر عن نفسك بالكلام

اسمها Broca's area

Area 44 لو انضربت

العيان ميقدرش يعبر عن نفسه بالكلام

يحصله حاجة اسمها expressive aphasia

يعني ايه ؟؟؟؟

أنا عايز أشرب أقولها كده أأأأأأ كوني طلعت صوت يبقا ال Larynx شغالة

يبقا العضلات مش paralyzed

كوني بشاور على المية عشان عطشان يبقا ال conscious level بتاعي كويس

مش عارف أتكلم ليه ؟؟؟؟

عشان Area 44 عندي مضروبة

I cannot express my ideas by spoken words

مفهوم ولا لا ؟؟؟؟ واضح ان شاء الله

جنب Area 44 فيه Area 45

Area 45 دي بتاعت ال Males

بتاعت الكتابة

هو يقعد يكتب هي عملت وعملت

ويحرق الورقة تاني يوم عشان متقعش في إيديها

واضح ؟؟

Area 45 الي هو expression by writing

Area 45 لو انضربت

العيان ميقدرش يعبر عن نفسه بالكتابة

يسموها إيه جرافيا agraphia

ال a دي للنفي وال graphia دي حروف

agraphia يعني ميعرفش يكتب

b. **Articulation:** Dysarthria

- Δ tract → slurred speech.
- Extra Δ tract → monotonous speech.
- Cerebellum → staccato speech.
- Basal ganglia → choreic speech.
- Cerebellum + Δ tract → slurred staccato (scanning).

4. Cranial nerves

See later.

5. Motor system examination

- a. Inspection: muscle state.
- b. Palpation: muscle tone.
- c. Percussion: fasciculation and myotonia.
- d. Power.
- e. Co-ordination.

a. Inspection: muscle state1. Position (posture):

- Semi flexed upper limb and hyper extended lower limb in spastic hemiplegia.
- Adducted, hyper extended both lower limbs in spastic paraplegia.
- Dropped wrists & feet in P.N.
- Semiflexed, abducted both lower limbs in myopathy.

2. Deformity

- Cause: Pott's disease causes paraplegia.
- Result:
 - ✓ Pes-cavus in P.N.
 - ✓ Talipes equines in myopathy.
- Association: Pes-cavus in hereditary-familial diseases as ataxia and myopathy.

3. Wasting (atrophy)**Comparison**

- Between both sides in unilateral diseases.
- Between the limb with itself in bilateral symmetrical diseases as inverted champagne bottle in peroneal muscle atrophy.

Wasting landmarks**Upper limb****Proximal:**

- ✓ Flat shoulder

Distal:

- ✓ Flat thenar and hypothenar.
- ✓ Prominent M.C.B.

Lower limb**Proximal:**

- ✓ Flat buttock.

Distal

- ✓ Pes-cavus.
- ✓ Prominent M.T.B.

4. Trophic changes

- Loss of hair in upper limb or lower limb.
- Brittle nails.
- Trophic ulcers.

b. Palpation (tone)

Upper limb	Lower limb
<ul style="list-style-type: none"> • Wrist "shaking". • Elbow "passive flexion & extension". • Shoulder : <ul style="list-style-type: none"> ✓ Gower method. ✓ Circumduction. 	<ul style="list-style-type: none"> • Ankle "shaking". • Knee "passive flexion & extension". • Hip: 3 methods.

Hip: 3 methods

Rolling	الخطف	Circumduction
For hypertonia	For hypotonia, positive frog's sign	For both hyper & hypotonia

Causes of hypertonia:

1. Δ tract lesion: **spasticity**, clasp knife (resistance in beginning of movement only).
2. Extra Δ tract lesion: **rigidity**, lead pipe (resistance all over the movement) or Cog-wheel (interrupted by tremors).
3. Myotonia.
4. Catatonia.
5. Meningeal irritation.

Causes of hypotonia:

- Lesion of reflex arc
 - ✓ Afferent = P.N. = Tabes dorsalis.
 - ✓ Centre "AHCs" = polio, motor neuron disease "M.N.D".
 - ✓ Efferent = P.N. "motor"
 - ✓ Effector = myopathy - myasthenia.
- Posterior column lesion.
- Cerebellar lesion except "Marie's"
- Extra $\Delta \rightarrow$ chorea.
- Shock stage.

c. Percussion (fasciculation & myotonia):

- Physiological fasciculation: fatigue, anxiety, coffee, tea, smoking.
- Pathological fasciculation: early polio-myelitis, motor neuron disease "M.N.D".

N.B.

- Examination by triggering \rightarrow flickering - hammer.

Myotonia:

Delayed relaxation of skeletal muscle.

- Voluntary: ask the patient to catch anything or shake hand.
- Mechanical: by "percussion"
 - ✓ On tongue: dimpling.
 - ✓ Thenar eminence: dimpling.
- Electrical.

d. Power:

Examination of

Routine

1. Limbs.
2. Trunk.

Special muscles.

1. Limbs

a. Without resistance

Upper limb		Lower limb	
Fingers	إتني صوابع إيديك - ابعدهم - ضمهم - سبح	Toes	إتني صوابع رجلك - افرد صوابع رجلك
Wrist	اتني كف إيديك - إفرد كف إيديك	Ankle	وش رجلك لفوق - وش رجلك لتحت
Elbow	إتني كوعك - إفرد كوعك	Knee	إتني ركبتك - إفرد ركبتك
Shoulder	ذراعك لفوق - ذراعك لتحت - جَنَح - صُم	Hip	فخذك لفوق - فخذك لتحت - جَنَح - صُم

b. Against resistance

- From distal to proximal.
- Flexion then extension.
- Abduction then adduction.
- Fix the joint that follow the joint examined.

2. Trunk:

- Ask patient to rise from bed.
- Observe umbilical movement.

Medical Research Council scale for muscle power (degree of muscle power):

0	No muscle contraction visible.
1	Flicker of contraction but no movement.
2	Joint movement when effect of gravity eliminated.
3	Movement against gravity but not against examiner's resistance.
4	Movement against resistance but weaker than normal.
5	Normal power.

Examination of the muscle power:

The muscles are tested against resistance on condition that they are not totally paralysed i.e. the patient can actively contract them.

a. In the upper limb:**Shoulder (mainly C4 - C5)**

- Adduction: pectoralis major & minor assisted by latissimus dorsi & teres major.

Ask the patient to adduct his arm against resistance or while patient presses his hands to his waist. Palpate the anterior axillary fold for the contracted pectoralis.



Exam. of shoulder adductors

- Abduction
 - ✓ 0° - 15° supra spinatus.
 - ✓ 15° - 90° deltoid.
 - ✓ 90° - 180° trapezius.
- Flexion: anterior fibers of deltoid. Ask the patient to raise his arm forwards against resistance.



Exam. of shoulder abductors

- Extension: posterior fibers of deltoid. Ask the patient to push his arm backward against resistance.
- Lateral rotators: infraspinatus & teres minor.
- Medial rotators: latissimus dorsi & subscapularis.
- The serratus anterior: ask the patient to push his arm forward against resistance, paralysis of this muscle leads to winging of the scapula.



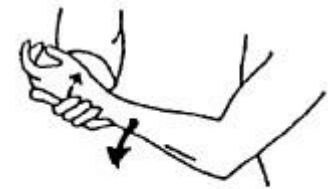
Exam. of elbow flexor "biceps"



Exam. of elbow flexor "brachioradialis"

Elbow (C5,6,7)

- Flexor: biceps, brachialis & brachioradialis.
 - ✓ Biceps: with the patient's arm extended by his side & the hand fully supinated. Ask him to flex his elbow against resistance.
 - ✓ Brachioradialis: as for the biceps but with the hand semi-pronated.
- Extensors: triceps, with the patient's elbow flexed ask him to extend it against resistance.



Exam. of elbow extensor "triceps"

Wrist (C7,8)

Test for flexion and extension against resistance while the fist is closed.

Hand (C8, Th 1).

Thumb:

1. Opponens pollicis: ask the patient to touch the tip of his little finger with the tip of his thumb.
2. Abductor pollicis brevis: it is the only muscle of his hand supplied by the median nerve than can be easily tested (as in carpal tunnel syndrome). Ask the patient to abduct his thumb at a right angle to the palm of the hand, the muscle can be seen and palpated.



Exam. of Opponens pollicis



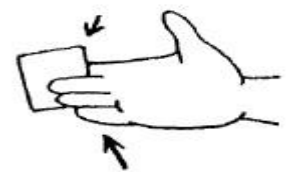
Exam. of Abductor pollicis brev.

Other fingers:

1. Abductors: dorsal interossei: patient abducts his fingers against resistance.
2. Adductors: palmar interossei: patient grasps a paper between 2 fingers.
3. Lumbricals: patient puts his fingers in the writing position.



Abductors



Adductors

b. Abdominal muscles (Th 6 - Th 12).

The patient lies down. Puts his hands over his chest, then attempts to sit up.

c. In the lower limb**Hip**

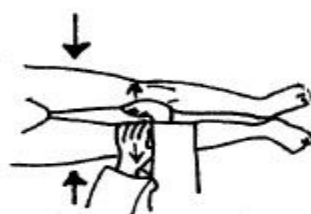
- Flexion: ilio-psoas (L1,2) : ask the patient to flex his hip against resistance.
- Extension: gluteus maximus (L5, S1,2): with the patient lying face downwards in bed. Fix his trunk with your hands & ask him to raise his L.L. against resistance.
- Adduction: adductors longus, brevis & magnus (L2,3,4) assisted by pectineus & gracilis. Abduct the thigh & ask the patient to bring it towards the midline.
- Abduction: gluteus medius & minimus (L5, S1) while the thigh is in the midline. Ask the patient to move it outwards.

EXAMINATION OF THE MUSCLES OF L.L.**I Hip:**

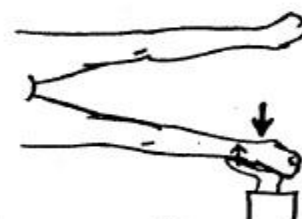
Flexion



Extension



Adduction



Abduction

Knee

- Extension: quadriceps (L2,3,4): ask the patient to maintain knee extension while you try to bend the knee, or bend the patient's knee & ask him to straighten it.
- Flexion: hamstrings (S1,2): ask the patient to pull his heel towards his buttock against resistance.

II Knee:

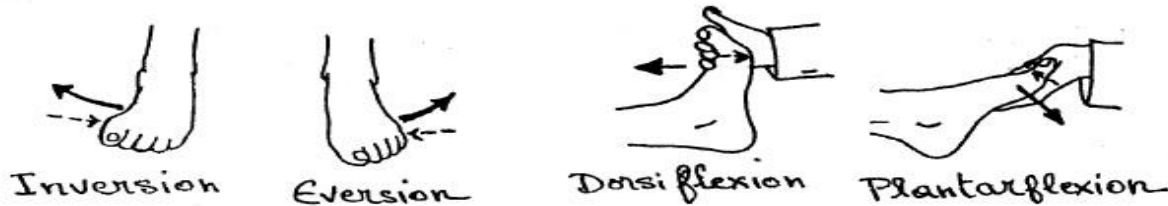
Extension



Flexion

Ankle

- Dorsiflexion: anterior tibial group (L4,5).
- Plantar flexion: calf muscles (S1,2): the patient moves his foot upwards & downwards against resistance.
- Inversion: tibialis anterior & posterior (L4).
- Eversion: peroneal muscle (L5): the patient inverts & everts his foot against resistance.

III Ankle:**d. Co-ordination**

Should be examine after power. Why???

Integration of

- Cerebellum → open eye.
- Deep sensation → closed eye.

Upper limb

1. Finger to nose.
2. Finger to finger.
3. Finger to doctor finger.
4. Finger to moving doctor finger.

Lower limb

1. Heel to knee.
2. Heel to doctor finger.

Positive if:

- Intention tremor.
- Decomposition of movement.
- Dysmetria.

6. Reflexes

i. Superficial reflexes

Planter reflex- abdominal reflex - cremastic reflex - anal reflex & gluteal reflex.

Planter reflex

- Centre: S1, 2 but mainly S1.
- Technique: normally, stroking the sole of the foot with a blunt object results in planter flexion of the toes.
- Normal response: planter flexion.
- Abnormally: dorsiflexion = positive Babinski = Extensor planter = up going reflex.
- Causes:
 - ✓ Δ tract lesion.
 - ✓ Infant ↓ 1 year.
 - ✓ Deep sleep.
 - ✓ Anesthesia & coma

} Easily excluded

Other methods to elicit planter reflexes

Toes	Lateral aspect of the foot	Back of the leg	Front of the leg
<ul style="list-style-type: none"> • Strunski. • Gonda 	<ul style="list-style-type: none"> • Shadok. • Barada. 	<ul style="list-style-type: none"> • Gordon. • Shiefer "Calcaneous tendon". 	<ul style="list-style-type: none"> • Obenhiem "shaft of the tibia".

1. **Strunski's method**: sudden abduction of the little toe.
2. **Gonda's method**: the 3rd & 4th toes are passively flexed, then suddenly released.
3. **Shaddock's method**: a scratch is made on the lateral aspect of the dorsum of the foot from the lateral malleolus to the little toe.
4. **Barda's method**: a scratch is made on the dead lateral aspect of the foot.
5. **Gordon's method**: the calf muscles are firmly squeezed.
6. **Schaefer's method**: the tendon Achilles is firmly squeezed.
7. **Oppenheim's method**: firm pressure is applied on the skin over the lower part of the shaft of the tibia, from above downwards.

Causes of equivocal response:

- L.M.N.L. at S1.
- Hypothesis at S1.
- Total paralysis of big toe.
- Marked deformity of the foot.



Abdominal reflex:

Center: T6 - T12.

Technique:

Upper abdominal reflex (Th 6 - 10): light stroking of the skin of the abdomen above the umbilicus, from the periphery inwards, using a pin.

Lower abdominal reflex (Th 10 - 12): light stroking is done below the level of the umbilicus, also from the periphery inwards.

In both cases, contraction of the ipsilateral abdominal muscles can be seen.

**Value:**

1. In hemiplegia: $\frac{1}{2}$ lost.
2. In paraplegia: level.
3. In D.S.: early lost.

Cremasteric reflex (L1): elicited by a stroke with a pin, along the upper part of the medial aspect of the thigh resulting in visible contraction of the cremasteric muscle.

Gluteal reflex (L4,5): elicited by a stroking across one of the buttocks with a pin resulting in contraction of the ipsilateral gluteal muscles.

Anal reflex (S3,4,5): elicited by scratching the skin of the perineal region resulting in contraction of the external anal sphincter.

ii. Deep reflexes

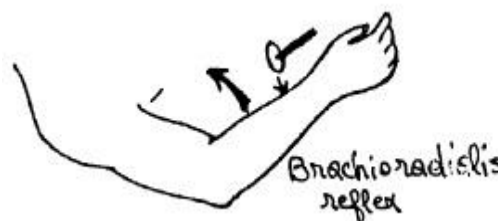
Upper limb	Lower limb
<ul style="list-style-type: none"> • Biceps C_{5,6}. • Brachio radialis C_{5,6}. • Triceps C_{6,7}. 	<ul style="list-style-type: none"> • Knee L_{2,3,4}. • Ankle S_{1,2}.

In the upper limb:1. Biceps reflex (C5,6):

Elicited by a tap upon the biceps tendon while the elbow is at 120°. the tap is done on your index finger placed over the tendon. It results in mild contraction of the biceps with slight flexion of the elbow.

2. Brachioradialis (C5,6):

Elicited by a tap 3 - 4 cm above the styloid process of the radius. While the elbow is at 120°. it results in mild contraction of the brachioradialis and slight flexion of the elbow.



3. Triceps reflex (C6,7):

Elicited by a tap directly on the triceps tendon while the elbow is flexed at 90° . It results in mild contraction of the triceps with slight extension of the elbow.

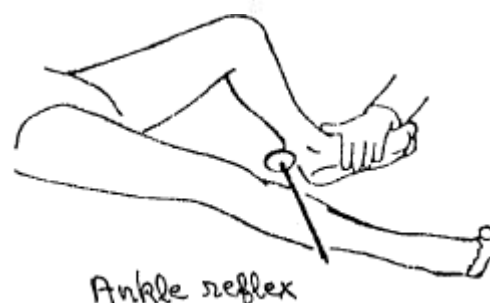
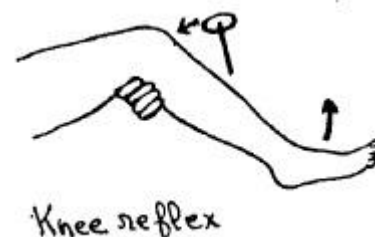
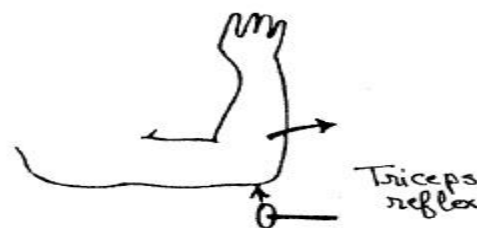
In the lower limb:

1. Knee reflex (L2,3,4):

Elicited by a tap on the quadriceps tendon while the hip joint is slightly flexed and the knee joint is flexed and supported from beneath by your hand. It results in visible contraction of the quadriceps and extension of the knee.

2. Ankle reflex (S1,2):

Elicited by a tap on the tendon Achilles while the thigh is abducted and externally rotated, the knee is flexed at 90° and the ankle is dorsiflexed by the examiner. It results in mild contraction of the calf muscles with planter flexion of the ankle.



Results

Normo reflexia	No response		Hyper reflexia
	Do reinforcement		Search for pathological reflexes & clonus
	Appeared	Not appeared	
	Hyporeflexia	Areflexia	

Degree of reflexes:

0	No reflex even by re-inforcement.
0/1	Reflexes obtained only by re-inforcement.
1	Normal hyporeflexia.
2	Exaggerated.
3	Brisk.
4	Clonus.

Causes of hyper-reflexia:

- Δ tract lesion.
- Thyrotoxicosis.
- Tetany.
- Tension.

Pathological reflexes

Upper limb	Lower limb
<ul style="list-style-type: none"> • Supraspinatus C3,4. • Finger flexion C8, T1. • Hoffman's C8, T1. • Wartenberg's C8, T1. 	<ul style="list-style-type: none"> • Patellar L2,3,4. • Adductor L4.

- The supraspinatus reflex: is done by tapping the supraspinatus muscle, in U.M.N.L. there is visible contraction of the muscles with slight abduction of the shoulder.
- The finger flexion reflex: is done by tapping the palmer surface of the middle 3 finger while they are slightly flexed, in U.M.N.L. there is prompt flexion of the finger.
- The patellar reflex: is done by pressing the upper border of the patella downwards with the examiner's index finger and then tapping the finger with the hammer, in U.M.N.L. there is contraction of the quadriceps and displacement of the patella.
- The adductor reflex: is done by tapping the index finger placed just above the adductor tubercle, while the hip is externally and slightly abducted, in U.M.N.L. there is visible contraction of the adductors with adduction of the thigh.

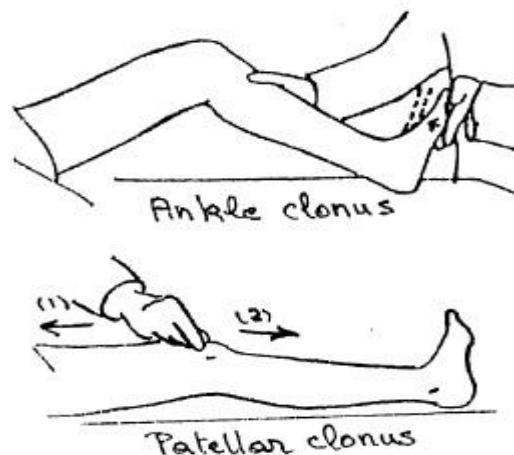
Clonus

Rhythmic contraction of the muscle after sudden sustained stretch of its tendon

Upper limb	Lower limb
<ul style="list-style-type: none"> • Wrist clonus C8, T1. 	<ul style="list-style-type: none"> • Patellar clonus L2,3,4. • Ankle clonus S1,2.

1. **Organic**: denoting a definite U.M.N.L. in which case. It stops with release of the stretch of the muscle.
2. **Hysterical**: where it persists in spite of release of the stretch of the muscle.

- Ankle clonus: is obtained by passive planter flexion of the joint followed by sudden dorsiflexion.
- Patellar clonus: is obtained by holding the patella and displacing it slightly upwards, this is followed by a sudden downward displacement of the patella.
- Wrist clonus: is obtained by sudden and sustained extension of the wrist.



N.B.

- The surest sign of Δ tract lesion is the organic clonus.

Sure signs of Δ tract lesion:

- Distribution of weakness.
- Hypertonia.
- Hyper reflexia.
- Positive Babinski.
- Pathological reflexes.
- Clonus (organic).

N.B.

Reflex = tone except in parkinsonism "hypertonia with hyporeflexia"

7. Sensation

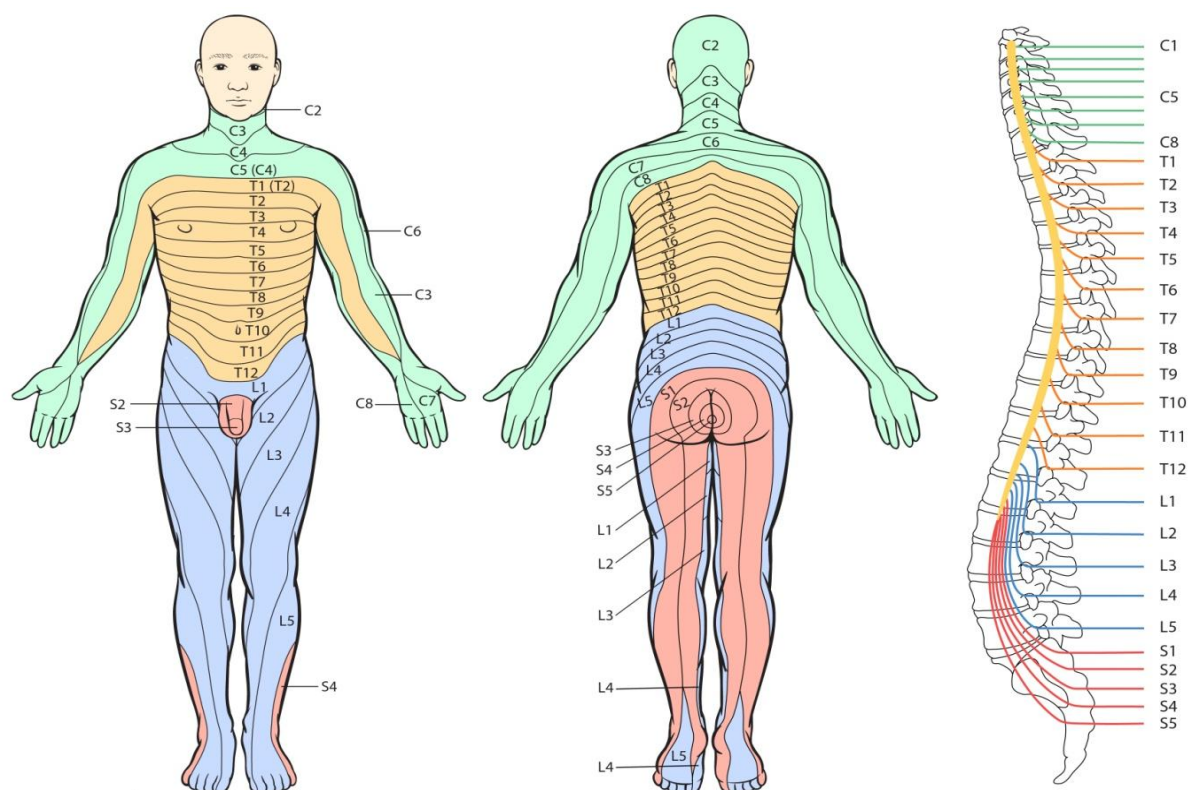
Superficial	Deep	Cortical
<ul style="list-style-type: none"> • Pain. • Temp. • Touch. 	<ul style="list-style-type: none"> • Vibration. • Position. • Movement. • Muscle sense. • Nerve sense. 	<ul style="list-style-type: none"> • Tactile localization. • 2 points discrimination. • Streognosis. • Graphesthesia. • Perceptual revolary.

Superficial sensation

1. Compare right with left at (face - upper limb - lower limb) → ↓ in one side in hemiplegia.
2. Compare the same side at (face - upper limb - trunk - lower limb)
 - Jacket of sensory loss in intramed. Comp. paraplegia.
 - Decrease sensation in both lower limb in extramed. Comp. paraplegia.
3. Compare proximal with distal (P.N.).
4. Level.
5. Circumferential.

Dermatome

C2	Angle of jaw, lateral neck.
C3, 4	Shoulder, down manubrium.
C5	Lateral aspect of arm.
C6	Lateral aspect of the forearm, thenar eminence & thumb.
C7	Middle aspect of the forearm, middle of the palm, middle 3 fingers.
C8	Medial aspect of forearm, hypothenar eminence & little finger.
T1	Medial aspect of arm.
T2 - T7	Thorax (T4 → nipple).
T8 - T12	Abdomen (T10 → umbilicus). (T12 → inguinal ligament).
L1	Upper 1/3 front of thigh.
L2	Middle 1/3 front of thigh.
L3	Lower 1/3 front thigh.
L4	Anterolateral aspect of thigh, front of knee, anteromedial aspect of leg, medial aspect of foot & big toe.
L5	Lateral aspect of thigh, lateral aspect of leg, middle 1/3 of dorsum of foot & middle 3 toes.
S1	Posterolateral aspect of thigh & leg, lateral 1/3 of dorsum of foot & little toe.
S2	Posterior aspect of thigh, leg & sole of the foot.
S3,4,5	Anal, perianal & gluteal region (saddle shaped area) in concentric manner.



Deep sensation

Vibration sensation: using tuning fork 128

Upper limb	Lower limb
<ul style="list-style-type: none"> • Styloid process of radius → P.N. • Clavicle → P.C. • Forehead → thalamus. 	<ul style="list-style-type: none"> • Medial malleolus → P.N. • ASIS → P.C. • Forehead → thalamus.

Place the vibrating fork over the bony prominences: medial malleolus - anterior tibial tubercle - anterior superior iliac spine (ASIS) - styloid process & clavicle.

Ask the patient if he feels the fork's vibrations & if they are felt equally on all sites if V.S. is diminished or lost over medial malleolus, check A.S.I.S., if lost, it suggest **posterior column lesion**, if intact, it suggests P.N. lesion.

Muscle sensation:

- Squeeze the calf muscle.
- Loss of muscle sense. Called abadie's sign as in diabetic P.N.
- Tender calf muscle in:
 - ✓ Diabetic P.N.
 - ✓ G.B.
 - ✓ Nutritional P.N.
 - ✓ D.V.T.
 - ✓ Myositis.

Position & movement: (joints sense)

Joint sense (sense of position and movement): first show the patient with his eyes open, the position of his big toe (dorsi-flexed), then with his eyes closed, move the big toe and ask him if he feels it moving and if so in which direction.

The big toe should be caught gently, from the sides.

Nerve sense:

By pressing the ulnar nerve and the lateral popliteal nerve against the bones. Normally, it results in an electric like sensation.

Romberg's test:

Ask the patient to stand with the heels together, 1st with his eyes open, then with his eyes closed.

Note any swaying or loss of balance.

If present:

- With eyes open or closed = cerebellar ataxia.
- Only with closed eyes = sensory ataxia.

Cortical sensations:

They are only examined when the superficial and deep sensation are intact.

1. **Tactile localization:** ask the patient to close his eyes, then prick his finger & ask him to localize the site of the prick.
2. **Two-points discrimination:** with the patient's eyes closed, deliver 2 simultaneous pricks, e.g. on the finger (5mm apart) or on the legs (4cm apart). Normally the 2 pricks are felt distinct from each other.
3. **Stereognosis:** with his eyes closed, the patient is asked to recognize a familiar object placed in his hand.
4. **Graphosthesia:** with his eyes closed, the patient is asked to recognize a number or letter drawn over his palm.
5. **Perceptual rivalry:** normally if you deliver 2 simultaneous pin pricks at 2 corresponding sites of the body, both pricks are felt; in cortical sensory loss, only the prick on the healthy side is felt.

Pattern of sensory loss	Site of lesion
1. Mononeural.	<ul style="list-style-type: none"> • Peripheral nerve.
2. Stock & glove.	
3. Maculo-anaesthetic (leprosy).	
4. Radicular sensory loss.	
5. Saddle area loss	<ul style="list-style-type: none"> • Conus
6. Dissociated sensory loss (brown sequard syndrome)	<ul style="list-style-type: none"> • Unilateral cord lesion.
7. Sensory level	<ul style="list-style-type: none"> • Extramedullary lesion.
8. Jacket sensory loss (dissociated)	<ul style="list-style-type: none"> • Intramedullary.
9. Crossed hemihyposthesia	<ul style="list-style-type: none"> • Lateral medullary syndrome.
10. Hemihyposthesia	<ul style="list-style-type: none"> • Capsular & brain stem lesion.
11. Cortical sensory loss	<ul style="list-style-type: none"> • Area (1, 2, 3) of parietal lobe.

8. Back and cranium

While the patient is standing then sitting to observe lumbar lordosis.

Back examination for

- Scar.
- Deformity.
- Tenderness.
- Café au lait patches "neurofibroma".
- Tuft of hair in spina bifida.

N.B.

To count the vertebrae from the back.

- The most prominent bone in back at C7.
- The angle of the scapula at T7.

Examination of the cranium

1. Size, shape, sutures & fontanelles.
2. Bony bosses & tenderness.
3. Dilated veins, bruits & naevi.
4. Mc Ewen's sign in brain tumor.

9. Gait

- Hemiplegia: circumduction.
- Paraplegia: scissoring.
- P.N.: high stepping.
- Sensory ataxia: stamping.
- Ferdrich's ataxia (archicerebellum): drunken.
- Marie's ataxia (Neo cerebellum):
 - ✓ Unilateral → deviation to one side.
 - ✓ Bilateral → Zigzage.
- Parkinsonism:
 - ✓ Short steppage.
 - ✓ Shuffling.
 - ✓ Festinant.
- Chorea: dancing.

10. Other systems

أنا حالتي hemiplegia مثلاً
ال heart by inspection, palpation, percussion and auscultation
وخلي بالك ال inspection كده سطر جنبها يعني متطولش كتير
وال palpation سطر على السريع
هو مفيش حاجة مش لازم ال hemiplegia يكون معاه مشاكل في القلب جايز يكون diabetic او Hyper tensive مش لازم عنده
مشكلة في القلب
بس انا هاقول للدكتور انا عرفت ان الحالة hemiplegia فانا فحصت قلب العيان وكاتبك ال comment
ال chest وال abdomen وال rheumatology
هتكتب no abnormalities were detected يبقا خلصت حالتك على كده

Cranial nerves

History and examination

Introduction

Group

- III IV VI oculo cranial.
- IX X XI bulbo cranial.

Special senses → I, II, VII .

Mixed "motor and sensory" VII, V, X.

Pure motor:

- III, IV, VI.
- XI, XII.

N.B.

- All cranial nerves have bilateral Δ tract supply:

Except :

1. Lower facial nucleus.
2. Hypoglossal XII "50%".
3. Spinal part of XI.

Which are supplied from the opposite side only, so these nerves are affected in unilateral lesion as hemiplegia.

Examination of cranial nerves

- History.
- Inspection.
- Power.
- Test of sensation.
- Reflexes.

N.B.

- Oral discussion in clinical examination
1. Anatomy.
 2. Physiology "function".
 3. Examination "technique".

ملحوظة بسيطة

لو حالتك طفل صغير

حاول إنك تنهى جملة فحص ال cranial nerves ب << as possible as regard the age

I (Olfactory)

History : هل حاسة الشم اتغيرت ؟؟؟

Examination :

- Substance
 - ✓ Familiar.
 - ✓ Not irritant e.g. coffee.
- Each nostril is examined separately with closed eyes.

**N.B.** Anosmia

- Unilateral → neurological disease as fracture base of the skull, meningitis or olfactory bulb tumor "Foster Kennedy syndrome".
- Bilateral → E.N.T. cause.

II (Optic)

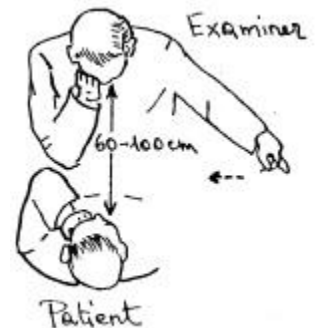
A sensory nerve for vision

History

1. Acuity of vision هل نظرك ضعيف ؟؟؟
2. Colored vision هل ترى الألوان ؟؟؟
3. Field of vision هل بتخبط في الناس والعواميد وأنت ماشي ؟؟؟

Examination

1. Acuity of vision: using Snellen's chart or finger counting from a distance of 6 meters. In case of failure to count the finger at this distance repeat at a shorter distance. If at a distance of 30 cm the patient still fails to count the finger test for vision use hand movements. If the patient does not see the movements, test for light perception using the torch. If there is no P.L. (perception of light) then the patient is blind. Each eye should be examined separately.
2. Colored vision: See ophthalmology.
3. Field of vision: the confrontation test:
 - Sit in front of the patient at a distance of 60 - 100 cm. keep your eyes at the level of the patient's eyes.
 - Let the patient close one eye and you close the opposite eye. Insist that the patient looks into your eye and nowhere else.
 - Examine for the field of vision of the patient's open eye by bringing your finger slowly from the periphery inwards. Test for the whole field by bringing your finger from above, below, left and right.

**Reflexes**

1. Light reflex "afferent: 2nd".
2. Accommodation reflex "efferent: 3rd".

Significance

Argyll Robertson pupil. Small, irregular, unequal which doesn't react to light but reacts to accommodation.

Causes:

- D.M.
- Neurosyphilis.
- D.S.
- Encephalitis.

Occulo cranial nerves**III (occulomotor), IV (trochlear), VI (abducent)****Introduction**

Muscles of the eye

- Extra ocular muscles.
- Intra ocular muscles.
- Extra ocular muscles
 - ✓ Superior rectus. } III "occulomotor"
 - ✓ Inferior rectus. }
 - ✓ Medial rectus. }
 - ✓ Lateral rectus → VI "abducent".
 - ✓ Superior oblique → IV "trochlear".
 - ✓ Inferior oblique → III "occulomotor".
- Intra ocular muscles
 - ✓ Dilator pupillae → sympathetic supply.
 - ✓ Constrictor pupillae → III.
 - ✓ Ciliary muscles → III.

i.e. All muscles of the eye are supplied by III "3rd " except 3 muscles "SO₄ LR₆"

- Superior oblique by trochlear.
- Lateral rectus by abducent.
- Muller muscles.

History

1. Ptosis هل جفناك سقط ؟؟؟
2. Squint هل عينك أحولت ؟؟؟
3. Diplopia هل بتشوف الحاجة اتنين ؟؟؟

Examination

- **Inspection**

1. Ptosis : which may be due to :

- ✚ Occulomotor nerve paralysis where the ptosis is complete and there is associated mydriasis and divergent squint.
- ✚ Sympathetic paralysis "Horner's syndrome" where the ptosis is partial and there is associated miosis, enophthalmos and anhydrosis.

2. Squint.

3. Pupils: they should be equal, round and reactive to light, and accommodation (RRR).

- ✚ The light reflex: if you expose one eye to light, while shading the other, normally there is constriction of the pupil of the exposed eye (direct reaction) as well as of the other eye (consensual reaction).
- ✚ The accommodation (near) reflex: when the patient is asked to follow your finger with both his eyes from a far to a near point, the following triad normally occur :
 - a. Convergence.
 - b. Miosis.
 - c. Accommodation.
- ✚ Cilio-spinal reflex: pinching the skin on one side of the neck results in dilatation of the ipsilateral pupil. This reflex is absent in cervical sympathetic lesion "Horner's syndrome".

4. Nystagmus.

• **Power****A. Each eye separately**

The patient close the other eye & the examiner fix the patient head.

- ✓ IV → superior oblique عيناك لكتفك
- ✓ VI → lateral rectus عيناك لبره
- ✓ III →
 - Superior rectus عيناك لفوق
 - Inferior rectus عيناك لتحت
 - Medial rectus عيناك لجوه

B. Both eyes together

If both eyes are normal to examine the conjugate eye movements

- عيناك الأثنين لفوق
- عيناك الأثنين لتحت
- عيناك الأثنين لليمين
- عيناك الأثنين للشمال

Significance

In ophthalmoplegia internuclearis in median longitudinal bundle (M.L.B.) lesion that may occur with multiple sclerosis.

N.B. Types of conjugate eye movement

1. Reflex: in reading.
2. Voluntary: on request.

Nystagmus

Definition: Oscillatory movement of the eye ball.

Character of nystagmus in cerebellar lesion:

1. On fixation.
2. Horizontal.
3. Biphasic (jerky).
4. Rapid phase toward the fixation point.
5. Bilateral.

Reflexes

1. Light reflex.
2. Accommodation reflex.

N.B.**Muscles of the face**

Pulling	Pushing
1. Retractor anguli (mouth). 2. Uvula.	1. Tongue. 2. Mandibular muscles.

Trigeminal nerve 5th cranial nerve

It is mixed cranial nerve

- Motor: muscles of mastication.
- Sensory: the main for the face, except skin overlying angle of the mandible which is supplied by C2.

anatomy

the trigeminal nucleus lies in the upper part of the pons which bilateral Δ supply and 3 sensory nuclei in the brain stem (see written notes).

Evaluation

- **History**
 - ✓ Motor ??? هل يوجد صعوبة في المضغ
 - ✓ Sensory ??? هل يوجد وجع أو شكشة أو تنميل في وجهك
هل الإحساس في وجهك قل أو اختفى ???
- **Inspection** : hollowness above or below zygoma.
 - ✓ Above: temporalis.
 - ✓ Below: masseter.
- **Power**: muscles of mastication.
 - ✓ Temporalis & masseter جز على أسنانك (والوقوف أمام المريض)
To touch the temporalis & catch the masseter.
 - ✓ Pterygoids

Ask the patient to open his mouth

Not deviated		Deviated
Normal	Bilateral weakness	<ul style="list-style-type: none"> • The same side of the lesion
Examine against resistance <ul style="list-style-type: none"> • Both together. • Each one separately. 	But the mouth is opened by gravity (D.D. between bilateral UMNL and LMNL by reflexes)	

Reflexes

1. Jaw reflex (temporalis masseter reflex) "afferent: 5th" " efferent: 5th"

Significance

- a. Bilateral.
- b. UMNL.

- c. Above the pons. (leveling reflex).
2. Corneal reflex "afferent 5th" "efferent 7th"

Significance

Absent in :

- a. Brain death.
- b. Deep coma.
- c. G.A.

3. Palatal reflex "afferent 5th" "efferent 10th"

N.B. the face is supplied by the trigeminal nerve through its branches (ophthalmic, maxillary & mandibular)

- **Sensation** 3 steps:

1. Compare between each corresponding parts (affection of one side in hemiplegia).
2. Compare the 3 parts at the same side with the area supplied by C2.

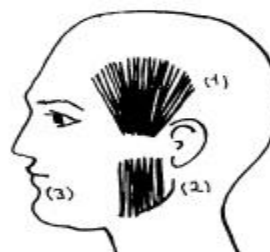
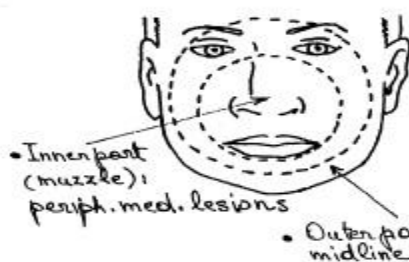
Value : compare face with body sensation

3. Compare central part with peripheral, upper with lower part of the face.

Value: to detect the site of the lesion in the nucleus.

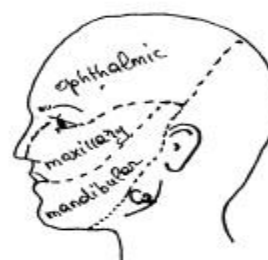
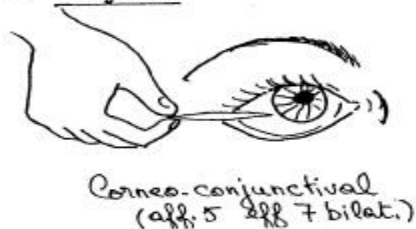
EXAMINATION OF TRIGEMINAL NERVE**I Motor :**

- | | |
|------------------|-------------------------------|
| (1) Temporalis | } with the jaws clenched |
| (2) Masseter | |
| (3) Pterygoids : | with open mouth & fixed head. |

**II Sensory :**

Compare:

1. Both sides
2. Each division
3. Inner & outer parts.

**III Reflex :**

Facial nerve (7th cranial nerve)

It is mixed Cranial nerve:

- Motor: the main for the face.
- Sensory: taste sensation from the anterior 2/3 of the tongue.





Anatomy

The nucleus lies in the pons.

Its upper half is bilaterally supplied by Δ tract.

Its lower half is unilaterally supplied by Δ tract from the opposite side only.

Lesion

Unilateral lesion		Bilateral lesion	
UMNL	LMNL	UMNL	LMNL
			

Examination

	History	Inspection	Power
Upper part	2	2	2
Lower part	3	3	3

History	Inspection	Power
هل الصابون بيدخل عينك؟؟ هل عينك بتدمع زيادة؟؟	<ul style="list-style-type: none"> • Wrinkles "frontalis" • Blinking. 	ارفع حواجبك اقفل عينك جامد
هل الأكل بيتجمع في فمك؟؟ هل ريقك بينزل؟؟ هل إتعوج فمك؟؟	<ul style="list-style-type: none"> • Nasolabial fold. • Dripping of saliva. • Mouth deviation. 	انفخ فمك صقر وريني أسنانك Retractor anguli

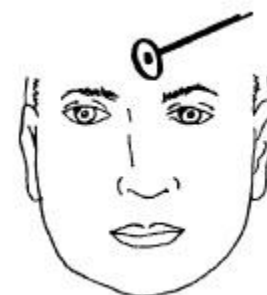
Reflexes

1. Glabellar reflex:

- Afferent 7th.
- Efferent 7th.
- Normally: blinking 4 - 6 times, then stopped due to habituation.

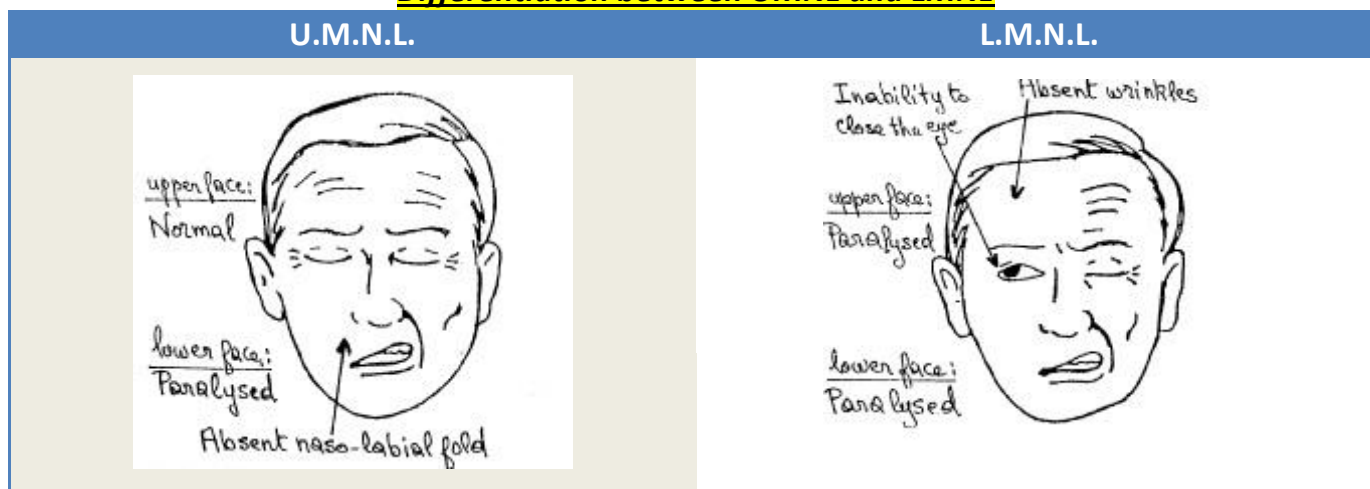
Significance

- Present: UMNL (exaggerated).
- Absent: LMNL.
- Persistent (no habituation): parkinsonism.



Corneal reflex

Sensation: taste sensation for the anterior 2/3 of the tongue.

Differentiation between UMNL and LMNL**Vestibulo-Cochlear (8th cranial nerve)**

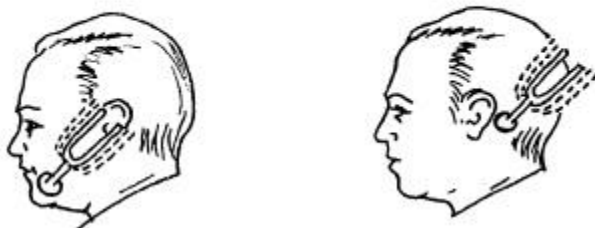
هل يوجد مشاكل في السمع والإتزان ???

- Cochlear part: test for the acuity of hearing using:
 1. The watch test: if there is diminution of the patient's hearing do the following:
 - a. Rinne's test: using the vibrating fork, compare air conduction (fork placed in front of patient's ear) with bone conduction (fork placed on patient's mastoid process).
 - b. Weber's test: place the tuning fork in the middle of the forehead.

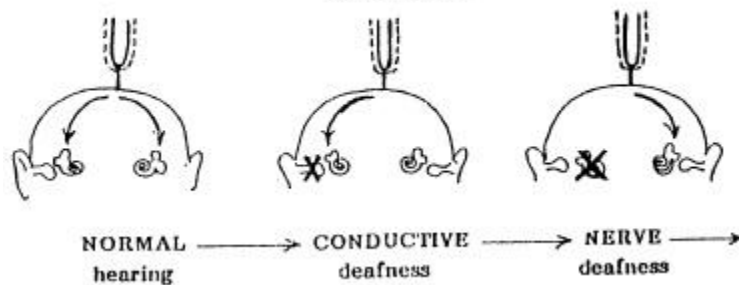
	Watch test	Rinne's test	Weber's test
Normal	The acuity of the patient's hearing is similar to that of the examiner.	Air conduction is better than bone conduction.	The vibrations are heard in the middle of the forehead.
Nerve deafness	The patient's hearing is less than that of the examiner's	Both air and bone conduction are diminished.	The vibrations are heard in the normal ear.
Conductive deafness	The patient's hearing is less than that of the examiner's.	Bone conduction is better than air conduction.	The vibrations are heard in the affected ear.

- Vestibular part:
 - Caloric test, rotating chair tests and electronystagmography (E.N.G.).

Rinne's Test.



Weber's Test



Bulbar cranial nerves**IX (glossopharyngeal), X (vagus) , XI (cranial part of accessory)**

These nerves supply the palate, pharynx & larynx

History	Evaluation
Palate 2	هل صوتك اخنف ??? هل الماء يرجع من أنفك ???
Pharynx 2	هل يوجد صعوبة في البلع ??? هل بتشرق كثير ???
Larynx 2	هل صوتك اتنبح ??? هل يوجد صعوبة في الكلام ???

- Power**

By using a tongue depressor and ask the patient to say ah & observe the uvula.

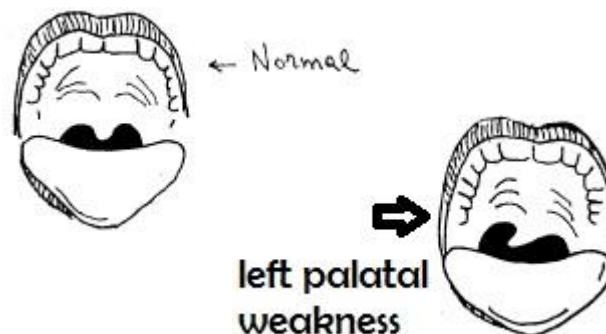
Slightly elevated upward (base of the uvula)	Deviated to the healthy side	No movement
Normal	Unilateral lesion	UMNL or LMNL D.D. by reflexes.

- Reflexes**

- Palatal reflex
 - ✓ Afferent 5th.
 - ✓ Efferent 10th.
- Pharyngeal reflex (gag reflex)
 - ✓ Afferent 9th.
 - ✓ Efferent 10th.

Technique:

Value :



Normal	LMNL	UMNL
Slightly elevated uvula.	No movement at all.	<ul style="list-style-type: none"> The uvula rapidly jumped upward. Gagging. Vomiting.

- Bilateral LMNL: true bulbar palsy.
- Bilateral UMNL: pseudo bulbar palsy.

The spinal part of accessory nerve

History: هل كتفك سقط ???

It supplies sternomastoid & trapezius.

Examination: against resistance.



Exam. of trapezius



Exam. of sterno-cleidomastoid

Hypoglossal nerve (12th cranial nerve)

It is a purely motor for the tongue

History: هل لسانك إتعوج ؟؟؟؟

Power : طلع لسانك بره

Deviated		Central	
The diseased side	Normal	Bilateral	
	Against resistance	UMNL	LMNL wasting wrinkling

N.B.

Tongue:

1. Parkinsonism (tremors).
2. Chorea (jerky movement).
3. Myotonia (dimple sign).



Rt. L.M.N.
Hypoglossal lesion

Summary of Neurology sheet

Personal history

Name

- اسم حضرتك إيه ؟؟

Age

- عندك كام سنة ؟؟

sex

Occupation

- بتشتغل إيه ؟؟

Marital status

- متزوج ؟؟ متزوج من إمتى ؟؟ عندك أولاد ؟؟ كام ولد ؟؟ أصغرهم عنده كام سنة ؟؟

Residence

- ساكن فين ؟؟؟ مولود وعایش طول عمرك هناك ؟؟؟

Special habits

- بتدخن ؟؟؟ كام سيجارة في اليوم ؟؟ بقالك كام سنة ؟؟ بطلت في خلال هذه الفترة ؟؟ بطلت ليه ؟؟
- بتشرب خمر أو مخدرات ؟؟ بطريقة منتظمة ولا في المناسبات ؟؟ نوع الخمر إيه ؟؟؟

Handedness

- بتستخدم إيدك اليمين أحسن ولا الشمال ؟؟؟

Complaint

Patient own words + duration

- إيه اللي تايبك ؟؟ إيه اللي جابك المستشفى ؟؟

History of present illness

1. Analysis of complaint.
2. Symptoms of the related system.
3. Other systems.
4. Investigation & treatment (related diseases).

Analysis of the complaint

onset

Acute

- الشكوى دي ظهرت فجأة ولا بعد أد إيه ؟؟؟

- ✓ Dramatic (seconds).
- ✓ Apoplectic (min.).
- ✓ Sudden (hours).
- ✓ Rapid < 14 days.

Course

- الأعراض ظهرت بالتدريج ولا على مدى أسابيع أو شهور ???
- أو بتحدث في نوبات ???

- ✓ Progressive.
- ✓ Regressive.
- ✓ Stationary.
- ✓ Remittent.
- ✓ Intermittent.

Symptoms of C.N.S.

(T.N.M + 3 Ss)

1. Symptoms of increased intracranial tension. (↑ I.C.T.).
2. Cranial nerves symptoms.
3. Motor system.
4. Sensory system.
5. Sphincter troubles.
6. Speech troubles.

1. Increased intracranial tension

- Headache

هل عندك صداع مستمر لا يستجيب للمسكنات ???

- Projectile vomiting

هل حدث لك قيء ???

- Blurring of vision

هل عينيك زغللت ???

2. Cranial nerves

- i. Olfactory → anosmia

هل حاسة الشم اتغيرت ???

- ii. Optic : (acuity - color vision - visual field)

- بتمشي تخبط في الناس والعواميد ???

- بتشوف الألوان ???

- iii. 3rd, 4th and 6th cranial nerves (ptosis - squint - diplopia)

- هل جفئك سقط ؟؟

- هل عينك احولت ؟؟

- هل بتشوف الحاجة اتنين ???

- iv. 5th cranial nerve

- Motor

- هل عندك صعوبة في المضغ ???

- Sensory

- هل يوجد وجع أو شكشكة أو تنميل في وجهك؟؟
- هل الإحساس في وشك قل أو اختفى؟؟؟
- v. 7th cranial nerve
 - Sensory
 - Motor
 - ✓ Upper motor
 - ✓ Lower motor
- هل بتحس بطعم الحلو والحادق؟؟؟
- ✓ هل الصابون بيدخل في عينيك؟؟؟
- ✓ هل عينيك بتدمع زيادة؟؟؟
- ✓ هل الأكل بيتجمع في فمك؟؟
- ✓ هل ريقك بينزل؟؟؟
- ✓ هل فمك اتعوج؟؟؟
- vi. 8th cranial nerve
(deafness - tinnitus - vertigo)
 - هل عندك مشاكل في السمع؟؟؟
 - هل عندك طنين في أذنك؟؟؟
 - بتحس إن الدنيا بتلف بيك؟؟؟
- vii. 9th and 10th cranial nerves
 - Palate
 - هل صوتك اخنف؟؟
 - هل الماء بيرجع من أنفك؟؟
 - Pharynx
 - هل يوجد صعوبة في البلع؟؟
 - هل بتشرق كثير؟؟؟
 - Larynx
 - هل صوتك اتنبج؟؟
 - هل يوجد عندك صعوبة في الكلام؟؟؟
- viii. 11th cranial nerve
 - Cranial part of accessory
 - ليس له سؤال
 - Spinal part of accessory
 - هل كتفك سقط؟؟؟
- ix. 12th cranial nerve
 - هل لسانك إتعوج؟؟؟
 - هل لسانك تقل؟؟؟

3. Motor system

Weakness

Onset, course and duration

Degree

- اللي عندك ضعف؟؟ ولا شلل؟؟

Tone

- عضلاتك سايبية ولا متخشبة؟؟؟
- شدت عليك من البداية ولا بعد المرض ما حصل بشوية؟؟؟

Wasting

- هل عضلاتك خست؟؟ ولا حجمها عادي؟؟؟

Trophic changes

- هل أظافرك بتتقصف؟؟؟

Fasciculation

- هل عندك رفة في عضلاتك؟؟

Upper limb / lower limb or both

- إيدك ولا رجلك؟؟؟ ولا الأثنين؟؟

Right / left or both

- يمين ولا شمال؟؟؟ ولا الأثنين؟؟

Upper limb (proximal / distal)

- تعرف تعصر الليمونة أحسن ولا تسرح شعرك؟؟؟

Upper limb (adductor / abductor)

- تلبس الجاكت أفضل ولا تضع كتاب تحت باطك؟؟؟

Upper limb (flexor / extensor)

- إيه أسهل ,, تفتح الدُرج ولا تقفله؟؟؟

Lower limb (proximal / distal)

- تطلع السلم أحسن ولا تلبس الشبشب؟؟؟

Lower limb (adductor / abductor)

- تحط رجل على رجل ولا تشلها أسهل؟؟؟

Lower limb (flexor / extensor)

- تلبس البنطلون ولا تفرد رجلك فيه أسهل؟؟

Involuntary movement

- هل عندك حركات لا إرادية؟؟؟

- فين؟؟ يمين ولا شمال؟؟

- إيدك ولا رجلك؟؟؟

Static / kinetic

- بتظهر أكثر مع الحركة ولا السكون؟؟؟

Regular / irregular

- منتظمة ولا غير منتظمة؟؟؟

Increased by / decreased by

Proximal / distal

Head & neck

Trunk

• بتزيد بآيه ؟؟ وبتقل مع إيه ؟؟

• ناحية الجسم ولا بره ؟؟؟

• فيه هزة في رأسك أو رقبتك ؟؟؟

• فيه حركات لا إرادية في جسمك ؟؟؟

Co-ordination

- Cerebellum
 - ✓ Upper limb: shaking / tremors .

✓ لما بتأكل ,, الأكل بيوصل لفمك ؟؟؟

- ✓ Lower limb: drunken gait.

✓ بتمشي طبيعي ولا بتتطوح زي السكران ؟؟؟

- Deep sensation
 - ✓ Lower limb: falling on closing both eyes

✓ لو غمضت عينيك وأنت بتغسل وشك بتقع ؟؟؟

4. Sensory system

- **Superficial** (pain - touch - temperature)
Onset + course + duration
 - ✓ Irritation: pain / parasthesia

✓ هل عندك تنميل أو شكشكة في جسمك ؟؟؟

- ✓ Destruction: hyposthesia / anaesthesia.

✓ هل الإحساس قل أو اختفى ؟؟

- ✓ Distribution: Sites & sensory level

✓ الإحساس قل فين بالطبط ؟؟؟

- **Deep sensation**

• بتحس إنك ماشي على الأرض ولا ماشي على قطن ؟؟؟

- **Cortical sensation**

• لما بتحط إيدك في جييبك ؟؟ بتعرف إيه اللي فيه ؟؟؟

5. Sphincteric troubles

(Micturation - Defecation - sexual function)

• هل عندك مشاكل في البول ؟؟

• بتتبول على نفسك ؟؟؟

• البول بيسبقك قبل ما تدخل الحمام ؟؟

• البول بيتأخر لما بتدخل الحمام وبيطول على بال ما ينزل ؟؟

- هل عندك مشاكل في المعاشرة الزوجية ؟؟
- أخبار الإنتصاب الصباحي إيه ؟؟
- بتأخذ أدوية ؟؟؟

6. Speech troubles

- هل عندك مشاكل في الكلام ؟؟؟

Other systems

- هل بتتعالج من أمراض أخرى ؟؟
- عندك الضغط أو السكر ؟؟
- بتأخذ أدوية لأي أمراض ثانية ؟؟؟

Hypothalamic syndrome

- بتأكل كثير ؟؟ بتشرب كثير ؟؟ بتنام كثير ؟؟؟

Investigations & treatment

patient investigated by CT, MRI, MRI with diffusion

وهكذا ,,,

and treated by clexan etc...

Past history

الأمراض المزمنة

أولاً مرض ال Diabetes Mellitus

- عندك سكر ؟؟ من إمتى ؟؟ أخذت علاج إيه ؟؟ جرعتيه أد إيه ؟؟ آخر تحليل سكر كان كام ؟؟ حصل أي مضاعفات ؟؟؟

ثانياً مرض ال Hypertension

- عندك ضغط ؟؟ من إمتى ؟؟ أخذت علاج إيه ؟؟ جرعتيه أد إيه ؟؟ آخر مرة قيست الضغط كان كام ؟؟ حصل أي مضاعفات ؟؟؟

ثالثاً مرض ال T.B.

- جالك زمان كحة ودم وبلغم ؟؟ كنت بتسخن بلبل وتبل الملاية عرق ؟؟ اتحجزت في مستشفى الصدر وأخذت علاج لفترات طويلة ؟؟

رابعاً مرض ال Hepatitis

- لو عينيك بقا أصفر ؟؟ لون البول اتغير ؟؟ رحت الحميات ؟؟؟

خامساً مرض ال D.V.T.

- رجلك ورمت ووجعتك ؟؟؟ حجزوك في المستشفى قبل كده وأدولك مسيلات للدم ؟؟

تسأل عن ال Major operations

- عملت عمليات جراحية قبل كده ؟؟ عملية إيه ؟؟؟ من إمتى ؟؟ حصل بعدها مضاعفات أو تلوث في الجرح ؟؟؟

تسأل عن ال Drug intake (INH, steroid, Barbiturates)

- بتأخذ أدوية بصفة مستمرة ؟؟؟ عندك حساسية من أي دواء ؟؟؟

تسأل عن ال Fever

- هل جت لك حمة قبل كده ؟؟ استمرت معاك كام يوم ؟؟؟

تسأل عن ال Trauma

- عملت حوادث قبل كده ؟؟ أو أصبت إصابات في جسمك أو رأسك أو العمود الفقري ؟؟؟

تسأل Similar attack

- هل جت لك الحالة دي قبل كده ؟؟ أو حدثت لك ؟؟

Family history

Similar condition

- حد في العائلة بيشتكى أو اشتكى من نفس الشكوى ؟؟ الأب والأم قرايب ؟؟؟

Cases discussion

Paraplegia

Definition

Paralysis or weakness of both lower limbs, It may be due to:

- Δ tract lesion (spastic).
- LMNL (flaccid).

Causes of flaccid paraplegia

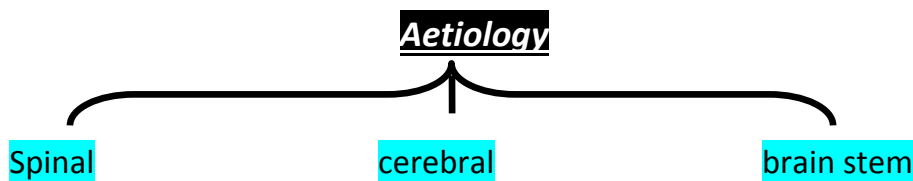
1. Shock stage.
2. Cauda equina lesion.
3. Bilateral poliomyelitis.
4. Severe myopathy.
5. Subacute combined degeneration.
6. Ferdrich's ataxia.

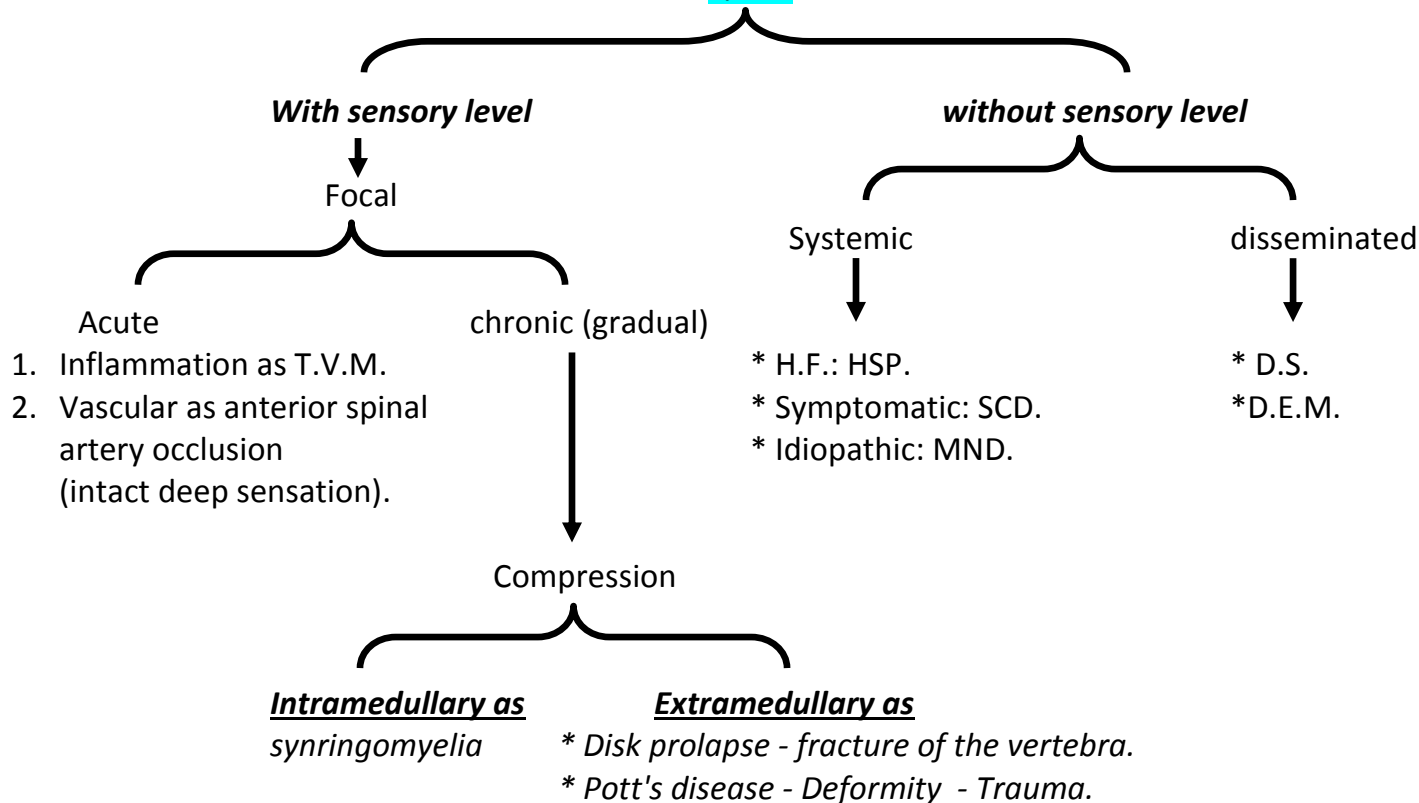
Clinical pictures

Features of UMNL in both lower limbs + spastic or scissoring gait.

Discussion

- Aetiology
- Level.
- Stage.
- Organic or hysterical.



Spinal

Intra medullary compression	Extra medullary compression
<ul style="list-style-type: none"> • Painless onset. • Symmetrical. • Jacket sensory loss. • Early sphincteric affection. • Late or no affection of saddle shaped area. 	<ul style="list-style-type: none"> • Painful (girdle pain). • Asymmetrical. • Sensory level. • Late or no sphincteric affection. • Early affection of saddle shaped area.

Level

Leveling in paraplegia

Clinically

1. History of girdle pain.
2. The sensory level.
3. The abdominal reflex (T6 - T12).
4. Beevor's sign (T10).
5. From scar or tenderness at the back (vertebral column).

by investigations

1. Plain X-ray.
2. Myelography.
3. C.T. Scan.
4. MRI.

Stage

- A. Acute:
 - a. Flaccidity (shock stage) with retention of urine.
 - b. Spasticity.
- B. Gradual:
 - Spasticity from the start.

Organic or hysterical

Organic: if sure signs of Δ tract lesion are present.

Diagnosis: a case of organic paraplegia due to focal extramedullary compression, with sensory level at T 10 in spastic stage.

N.B.

- *H.S.P (hereditary spastic paraplegia) means paraplegia with intact sensation.*
- *Paraplegia due to Δ tract lesion is associated with spasticity that present in extensor (paraplegia in extension).*
- *If extra Δ tract are also affected, paraplegia is passed from paraplegia in extension to paraplegia in flexion which can be detected early by (**Pierre marie foix reflex**), characterized by less exaggerated reflexes, no pathological reflexes or clonus.*

Pierre Marie foix :

Test is done by firm passive planter flexing of the toes and foot, this will result in spontaneous "withdrawal reflex" i.e. spontaneous flexion of the hip, knee and dorsiflexion of the ankle if the paraplegia is passing from extension to flexion.

Hemiplegia***Definition***

Paralysis of one side of the body due to Δ tract lesion at any point from the cerebral cortex down to the 5th cervical segment (origin of brachial plexus).

Clinical pictures

Features of UMNL of the paralysed side + circumduction gait.

Discussion

- Aetiology.
- Level.
- Stage.
- Organic or hysterical.

Aetiology

1. Mainly vascular

Embolus

Dramatic onset

Hemorrhage

apoplectic onset

Thrombosis

sudden onset + history of D.M or hypertension

2. Inflammatory.
3. Congenital.
4. Neoplastic.
5. Disseminated (D.S.).
6. Hysterical.

Aetiology

Cerebral	Brain stem	Spinal cord
	<ul style="list-style-type: none"> Hemiplegia (UMNL) on the opposite of the lesion + Cranial nerve paralysis (LMNL) on the same side of the lesion. 	<ul style="list-style-type: none"> Ipsilateral hemiplegia. Ipsilateral deep sensation. Contralateral superficial sensory affection.

Cerebral hemiplegia

Cortical	Sub-cortical	Capsular
Monoplegia > hemiplegia ± Coma ± convulsions ± cortical sensory loss ± aphasia & agraphia	As cortical with more extensive paralysis	<ul style="list-style-type: none"> Contralateral hemiplegia. Contralateral hemianaesthesia. Contralateral cranial nerves affection (lower facial - hypoglossal - spinal part of accessory).

Stage

- A. Acute:
 - a. Flaccidity (shock stage).
 - b. Spasticity.
- B. Gradual: spasticity.

Organic or hysterical

Organic hemiplegia: if there are sure signs for Δ tract lesion.

Diagnosis: a case of organic capsular hemiplegia due to thrombosis, in the

Peripheral Neuropathy (P.N.)**Aetiology**

1. Diabetic P.N.
2. Peroneal muscle atrophy.
3. Lead P.N.

Diabetic P.N.**D.M. sheet**

- History :
 1. History of D.M. since.....
 2. Manifested by
 3. Investigated by
 4. Controlled by
 5. Complicated by
- Examination:
 1. General
 - ✓ Head: eye (any disease), teeth (lose of teeth).
 - ✓ Foot: diabetic foot.
 - ✓ Blood pressure:
 - ✚ Hypertension.
 - ✚ Postural hypotension (so, B.P. should be measured twice, during standing and in flat position).
 - ✓ Pulse: conditions of the blood vessels.
 2. Skin examination in a diabetic patient:
 - ✓ Increase incidence of infection.
 - ✓ Trophic changes "neuropathic manifestations".
 - ✓ Vascular manifestations "ischemia".
 - ✓ Effect of treatment: insulin injection "lipo dystrophy".
 - ✓ Specific:
 - ✚ Necropoiesis lipotic diabeticorum (NPLD).
 - ✚ Bollus diabeticorum.
 3. Heart examination in a diabetic patient:
 - ✓ Ischemic heart disease.
 - ✓ Cardiomyopathy.
 4. Abdominal examination in a diabetic patient:
 - ✓ Liver: fatty.
 - ✓ Kidney: Kemilestile Wilson's syndrome "diabetic nephropathy".
 5. Chest examination in a diabetic patient:
 - ✓ Increase infections particularly T.B.

Neurological complications of D.M.

- Comas.
- Argyll Robertson's pupil.
- Diabetic lateral sclerosis.
- P.C. lesion.
- P.N.

Clinical pictures of peripheral neuropathy

Motor	Sensory		Autonomic neuropathy
L.M.N.L.: <ul style="list-style-type: none"> • Wasting. • Trophic changes. • Hypotonia. • Hyporeflexia. Distribution: (bilateral / symmetrical) <ul style="list-style-type: none"> • L.Ls. > U.Ls. • Distal > proximal. • Extensor > flexor. • ± adductor > abductor 	Superficial	Deep	<ul style="list-style-type: none"> • C.V.S: Early : parasympathetic loss: fixed sinus tachycardia. ECG: absent respiratory sinus arrhythmia. N.B. late sympathetic loss: postural hypotension, difference should be ↑ 30 mmHg in systole & ↑ 10 mmHg in diastole. If no postural hypotension: B.P. while lying equal to it while standing. • Genital: impotence "see before". • GIT: <ul style="list-style-type: none"> ✓ Gastroparesis diabeticorum: " delayed emptying : dyspepsia, vomiting & distention" ✓ Diabetic enteropathy " change in bowel habit". • Sweat: <ul style="list-style-type: none"> ✓ Anhydrosis. ✓ Gustatory sweating.
	1. Irritation <ul style="list-style-type: none"> • Pain. • Parasthesia. 	<ul style="list-style-type: none"> • Vibration. • Position. • Movement. • Muscle. • Nerve. 	
	2. Destruction <ul style="list-style-type: none"> • Hyposthesia. • Anaesthesia. 		
	Gloves & stocks		

N.B. Charcot's joint:

- Lost deep sensation → destruction of articular cartilage → ↑ range of movement.

Gait

- High steppage (P.N.).
- Stamping gait (sensory ataxia).

Cranial nerves

3rd, 5th, 7th & 8th may be affected.

Diagnosis: a case of P.N., motor and sensory but mainly sensory, most probably diabetic.

Investigation

1. Glycosylated Hb.
2. Nerve conduction study.

Treatment

1. Control of D.M.
2. Capillary modulators as doxium.
3. Vitamin B1 complex.
4. Aldose reductase inhibitor.
5. Physiotherapy.

Subacute Combined Degeneration (S.C.D.)

Components

- Δ tract lesion.
- Posterior column lesion.
- P.N.

Causes

- ↓ vitamin B₁₂ (mainly).
- Pellagra.
- D.M.

N.B.

- *Subacute means the onset within days.*
- *Combined means affection of different parts as Δ tract, P.C. and P.N.*
- *S.C.D. + cerebellar lesion = Ferdrich's ataxia.*
- *S.C.D. - P.C. = pellagra.*

Ataxia

Definition

Inco-ordination of voluntary motor activity in absence of motor weakness \pm disequilibrium.

Types

- Cerebellar.
- Sensory.
- Vestibular.
- Hysterical.

N.B.

- *Mixed ataxia = cerebellar + sensory.*

Cerebellum

Archi-cerebellum "Floculo nodular "	Paleo-cerebellum "Anterior lobe"	Neo-cerebellum "Posterior lobe"
↓	↓	↓
Equilibrium	Not in human being	<ul style="list-style-type: none"> • Co-ordination • ↑ tone

So, in archi-cerebellar lesion (Ferdrich's ataxia) the main complaint is the drunken gait
And in neo-cerebellar lesion (Marie's ataxia) the main complaint is inco-ordination.

N.B.

- *In cerebellar lesion there is hypotonia & hyper-reflexia.*

Causes of cerebellar ataxia

1. **H.F.:** bilateral & symmetrical gradual onset & progressive course as Ferdrich's & Marie's ataxia.
2. **Symptomatic:** 2ry to
 - a. Infection (encephalitis).
 - b. Vascular.
 - c. Alcohol or barbiturates intake.
 - d. Tumors.
 - e. D.S. (the commonest cause).
3. **Idiopathic:** in old age.

	Fredrich's ataxia	Marie's ataxia
Components	1. Archi-cerebellar lesion. 2. Δ tract lesion. 3. P.N. lesion. 4. P.C. lesion.	1. Neo-cerebellar lesion. 2. Δ tract lesion.
Tone & reflexes	↓↓	↑↑
Speech	Staccato or scanning	Slurred, staccato or scanning.
Gait	Drunken gait	Scissoring or drunken gait
Ataxia	Mixed	Pure cerebellar
Planter reflex	Positive Babiniski	Positive Babiniski
Association	1. Pes-cavus. 2. Heart lesion. 3. D.M. (40%).	No

Clinical pictures

Archi-cerebellar lesion:

- Staggering gait.
- Swaying upper limb.

Neo-cerebellar lesion:

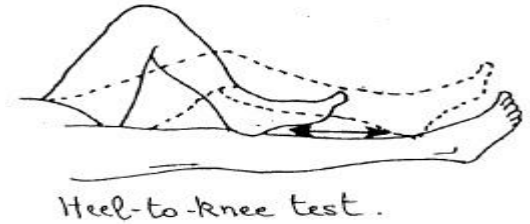
- Nystagmus (Chr.).
- Head nodding (D.D.).
- Trunk: titubation.
- Upper limb:
 - Intension tremors.
 - Dysmetria.
 - Decomposition of movement.
- Lower limb:
 - Unilateral: deviation of the body toward the affected side.
 - Bilateral: zigzag gait.

Specific co-ordination test

- Fingers:
 - Finger to nose test.
 - Finger to finger test.
 - Finger to doctor's finger test.
- Hand:
 - Adiadokokinesia.
 - Rebound "Holm's test".
 - Buttoning and unbuttoning test.



- Leg:
 - Heal to knee test.
 - Heal to doctor's finger test.
 - Foot to foot "straight line" → tendon gait (the earliest sign).



Sensory ataxia

P.C. lesion

Clinical pictures

- Hypotonia & hyporeflexia.
- Positive co-ordination tests only on closure of the eyes.
- Romberg's test: the patient sways and may fall if not supported.
- Deep sensory loss (vibration, position, movement & muscles).
- Stamping gait.

N.B. D.D. of the head nodding

1. A.R. (with pulse).
2. Parkinsonism (static).
3. Ataxia (kinetic).

N.B. Neurological diseases with intact sensation:

1. Muscles disease (myopathy, myotonia, M.g., myositis)
2. M.N.D.
3. Marie's ataxia.
4. Parkinsonism.
5. Poliomyelitis.
6. Chorea.
7. H.S.P.

Myopathy

- It is one of the muscles disease.
- Systemic (bilateral, symmetrical, gradual onset and progressive course).
- It affect the proximal muscles & characterized by :
 - Proximal wasting.
 - Proximal weakness.
 - Proximal hypotonia.
 - Proximal hyporeflexia.
 - Intact sensation.

History

- **C/O:** inability to stand from sitting position.
- **F.H.:** positive in his male brothers as it is **X-linked disease** (females only carrier).
- **P.H.:** \pm corticosteroids.

Examination

- **Intact sensation.**
- **Motor system:**
 - **Skeletal deformities**
 - ✓ *Pes-cavus*.
 - ✓ *Talipes equines*.
 - **Wasting:** more proximal.
 - **Tone:** hypotonia.
 - ✓ Hip: frog's sign.
 - ✓ Shoulder: telescopic sign.
 - **Reflexes:** hyporeflexia.
 - **Power:** weakness

Bilateral, symmetrical, proximal,
adductor, extensors

Effects of muscle weakness in myopathy

1. Abdominal muscles → pot belly abdomen.
2. Compensatory lordosis due to weak extensors (disappear with sitting as it is a compensatory).
3. Talipes equines with hyperkeratosis due to weak extensors.
4. Gait: wide base + waddling gait due weak glutei.
5. Gower sign.

Clinical & oral discussion in a myopathy case

1. Muscle selectivity.
2. Types of myopathy + D.D.

Muscles spared in myopathy (S.T.P.)

1. Sternomastoid.
2. Trapizus "upper fibers".
3. Pectoralis major "clavicular head".

Examination of muscles of the shoulder girdle

1. Adductors:
 - 0 - 15° → supra spinatus.
 - 15° - 90° → deltoid.
 - > 90° → trapizus.

2. Ask the patient to put his hands on his waist and palpate:
 - Palpate anterior fold of axilla Sternal head of pectoralis major.
 - Palpate the posterior fold of axilla & ask the patient to cough Lattismus dorsi.
 - Ask the patient to push backward against resistance rhomboidus.
3. Ask the patient to push the wall and observe winging of scapula:
 - **S**erratus anterior.
 - **T**rapizus.
4. حركة كمال الأجسام : palpate contraction of clavicular head of pectoralis major.
5. Sternomastoid and upper fibers of trapizus.

Types of myopathy

Myositis	Myotonia	Muscle dystrophy i.e. myopathy	M.g.
<ul style="list-style-type: none"> Toxic manifestation. Tender muscle. 	<ul style="list-style-type: none"> Positive myotonic phenomenon. Sternomastoid must be affected. 	<ul style="list-style-type: none"> Negative. Spared. 	<ul style="list-style-type: none"> Descending man. Diurnal variation.

Myopathy

Atrophic type (wasted)	Pseudo hypertrophic type	Others
<ul style="list-style-type: none"> Pelvic girdle type. Shoulder girdle type. Pelvic and shoulder girdle type. Fascio-scapulo humeral type. 	Usually affect (Calf muscles - deltoid muscle) <ul style="list-style-type: none"> Duchenne myopathy. Baker type. 	<ul style="list-style-type: none"> Occular type. Occulo - pharyngeal type.

	Duchenne	Baker
Age	1st decade.	2nd decade.
Course	Very progressive & end fatally.	Benign.
Association	Heart and skeletal.	No.

Diagnosis: a case of muscle disease → muscle dystrophy (myopathy) → pseudo hypertrophy → Baker variety.

Investigations (very important)

1. Serum creatin and creatinin.
2. Serum CPK (isozyme M.M.).
3. E.M.G.
4. Muscles biopsy.

Treatment

1. ↑ glycin in diet.
2. Physiotherapy.
3. Gene therapy.

M.N.D.**Definition**

Systemic disease of unknown origin with degeneration of motor neuron with normal sensation

Anatomical classification

Spinal	Brain stem (Bulbar type)	Spino-bulbar
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Pathological classification

Pure UMNL	Pure LMNL	Mixed
<ul style="list-style-type: none"> • Positive Babinski sign. • Δ tract distribution. • Hypertonia. • Hyper reflexia. <p style="text-align: center;">↓</p> <p>1ry lateral sclerosis (L.S.)</p>	<ul style="list-style-type: none"> • Wasting. • Fasciculation. • Hypotonia. • Hypo reflexia. <p style="text-align: center;">↓</p> <p>Progressive muscle atrophy</p>	<ul style="list-style-type: none"> • Positive Babinski sign. • Δ tract distribution. • Wasting. • Fasciculation. <p style="text-align: center;">↓</p> <p>A myotrophic lateral sclerosis.</p>

Diagnosis: a case of M.N.D. → spinal type → mixed type → a myotrophic lateral

Multiple Sclerosis (M.S.)

Chronic inflammatory disorder of C.N.S. white matter.

Types

1. Remittent relapsing.
2. Primary progressive.
3. Secondary progressive.
4. Progressive relapsing.

Aetiology

unknown but may be:

1. Auto-immune: antigen sheath Ab in C.S.F.
2. Infection: viral, Chlamydia.

Precipitating factors

- Trauma.
- Operations.
- Stress.
- Infection.
- Psychic trauma.

Criteria of M.S. with good prognosis:

- Female, young age, remittent relapsing type.

Clinical pictures (MSC, MSC)

1. **M**entality Euphoria or depression.
2. **S**peech Slurred or staccato.
3. **C**ranial nerves 2,3,7,8 plus MLB (medial longitudinal bundle) leads to ophthalmoplegia internuclearis.
4. **M**otor Pyramidal tract lesion.
Mono > para > hemi > quadriplegia.

N.B. acute onset but spastic from the start.

5. **S**ensory P.C. (L.Hermitt's sign).
6. **C**erebellar ataxia.

Investigations

1. MRI.
2. C.S.F.
3. Visual evoked response.

treatment

1. During attack:

Methyl prednisolone 1 gm vial / day for 3 - 5 days.

2. In between attacks:

✓ B interferon.

✓ Vitamin B.

Physiotherapy.

Chorea

Definition

Involuntary, static, irregular, dysrhythmic, sudden, jerky, pseudo purposive movement of any part of the body due to lesion in caudate nucleus.

- Caudate nucleus is a part of basal ganglia which is one of the extra pyramidal system.

Causes

- **H.F.:** usually associated with Friedrich's ataxia athetotic movement.
- **Symptomatic:**
 - Auto immune: rheumatic chorea with other Rh. Criteria but never with arthritis, it lasts within 3 - 6 months from its onset.
 - Infective: post encephalitis.
 - With pregnancy: chorea gravidarum.
- **Idiopathic:** in old age.

Clinical pictures

- Clinical picture of the associated disease as ataxia, athetosis or rheumatic fever.
- choreic movement: tongue and facial muscles ↑ with emotions and ↓ with sleep.
- Hypotonia: specific tests for chorea.

- ✓ When the patient stretches his arms, there is flexion at the wrist and over-extension of meta carpo phalangeal joint (MCP) and I.P. joints with fanning of the fingers "Scaphoid shaped hand".
- ✓ When the patient elevates and supinates his arms, they deviate downwards and laterally and become pronated.
- ✓ Pendular knee jerk (in dangling position).

- Emotional instability: a sudden laughing or crying is observed in most cases.
- Speech: choreic speech.

Treatment

- Phenothiazines.
- Haloperidol.

Diagnosis: a case of H.F. syndrome including Feridrich's ataxia, chorea with athetotic movement.

Neurology (long case)

1. History

Personal history

Mr., 70 years old, driver, married and has 4 children, the youngest is 26 year old, from Hadayik Elqoba. He is a heavy smoker and right handed.

Complaint

Patient is complaining of: weakness in the left upper & lower limbs of 24 years duration.

Present history

The condition started 24 years ago by sudden onset and regressive course of weakness of the left upper and lower limbs, the muscles were flaccid for 4 weeks then became stiff with weakness more distal than proximal, abductors than adductors, flexors than extensors in lower limbs and extensors than flexors in upper limb, there is no wasting, fasciculation or trophic changes. There is no involuntary movements or inco-ordination.

From the onset of the disease, there is accumulation of food in left side, deviation of mouth to right side, deviation of tongue to left side, no dripping of saliva. There is dropping of left shoulder and no other cranial nerves affection.

There is speech troubles with the onset of the disease, but improved after 2 months. There is hemihyposthesia in left side of the body and upper & lower parts of the face. The patient feels as he is walking on a cotton on left side.

The patient denied that there is no sphincteric troubles. There is no hypothalamic manifestations, no symptoms of increase ICT, no coma, no convulsion, no fever.

The patient used to suffer manifestations of systemic hypertension which is controlled by β - blockers. There is no other system affection.

Past history

Hypertension controlled by β - blockers, no other diseases.

Family history

Family history is irrelevant.

Diagnosis

A case of organic spastic left side capsular hemiplegia due to thrombosis secondary to hypertension (atherosclerosis).

2. General examination

- The patient with an average general condition, fully conscious, oriented by time, place and persons, with good mood and memory, co-operative with an average intelligency.
- The patient with an average built for his age, he lies comfortable in bed, no pallor, jaundice or cyanosis, no characteristic facies of medical importance.
- **Respiratory rate:** 17 / min, **pulse:** 85 beats / min. regular, equal in both sides, **temperature:** 37.7° C. **blood pressure:** 140 / 90 mmHg (hypertension).
- **Head examination:** no ptosis, oedema or subconjunctival hemorrhage, there is deviation of mouth to right side & deviation of tongue to left side.
- **Neck examination:** no congested neck veins, regular carotid pulsation and no lymph nodes enlargement.
- **Upper limbs:** there is no tremors, deformities or clubbing.
- **Lower limb:** there is no oedema or clubbing.
- **Cardiovascular examination:** elevated BP, signs of left ventricular enlargement with heaving apex, accentuated 1st and 2nd heart sounds with ejection click. (systemic hypertension).
- No abnormality detected in **other systems**.

3. Neurological examination

1. **Speech:** no speech troubles.
2. **Cranial nerves:**
 - **I:** no abnormality detected.
 - **II:** visual acuity & visual field: no abnormality detected. intact light and accommodation reflex.
 - **III, IV & VI:**
inspection: no ptosis, no squint, pupil: regular, round, reactive to light & accommodation, equal in both sides. No nystagmus.
power: the patient can move each eye separately and both eyes together in all directions. No abnormality detected.
 - **V:**
inspection: no hollowness above or below zygoma.
power: muscles of mastication & pterygoids act normally.
reflexes: absent jaw reflex & intact corneal reflex.
sensation: loss of sensation in left half of the face (upper & lower parts + area supply by C2).
 - **VII:**
inspection: left side: intact wrinkles of forehead, absent nasolabial fold, deviation of mouth to right side & no dripping of saliva.
power: upper part normal, patient can elevate his eye brow & close his eyes.

Lower part paralyzed (weak orbicularis oris on smiling) indicated that contralateral lower facial nerve affection.

- **VIII** : no abnormality detected.
- **IX & X** :
normal uvula elevation
intact gag & pharyngeal reflex.
- **Spinal part of accessory**:
inspection: dropping of left shoulder.
power: the patient can't elevate his left shoulder against resistance.
- **Hypoglossal nerve**: tongue: no wasting & fasciculation. The tongue deviated to left side.

There is contralateral cranial nerves affection (lower facial - hypoglossal - spinal part of accessory).

3. **Motor system**:

- **Inspection** : there is semi-flexed left upper limb and hyper extended left lower limb, no muscles wasting, no deformity, no trophic changes.
- **Palpation**: there is hypertonia of left side of the body clasp knife type affects antigravity more than progravity muscles.
- **Percussion**: there is no fasciculation or myotonia.
- **Power**: there is paralysis (weakness) of left side of the body affects progravity more than antigravity and distal more than proximal muscles.

4. **Reflexes**:

- Planter reflex: positive Babinski sign.
- Abdominal reflex: lost on left side.
- Exaggerated deep reflexes in left upper and lower limbs.
- Pathological reflexes appear on left side: (Hoffman - wartenburg - finger reflex - patellar reflex - adductor reflex).
- Loss of superficial reflexes in left side of the body.
- Ankle, patellar & wrist clonus are presented.

5. **Sensory system**:

There is hemihypoesthesia on the left side of the body, loss of deep sensation on left side & normal cortical sensation on right side (not examined on left side).

6. **Back**: there is no scars, deformity or tenderness.

7. **Gait**: the patient has left circumduction gait. (Hemiplegia gait).

Thalassemia

An example of chronic haemolytic anemia

Pathophysiology

↓ R.B.C.s life span.

1. Hepatosplenomegaly.
2. Hemoglobin:
 - Heme :
 - ✓ Iron (bronze diabetes → cardiomyopathy, skin ulcers).
 - ✓ Bilirubin → bilirubin → pigmented stones in G.B.
 - Globin.
3. Anemia: with mild pallor
 - ↑↑ anemia & pallor in:
 - a. Haemolytic crisis.
 - b. Aplastic crisis.
 - c. Megaloblastic crisis.
 - d. Hyper splenism.
4. Jaundice: mild
 - ↑↑ jaundice in:
 - a. Haemolytic crisis.
 - b. Hepatitis (Blood transfusion).
 - c. Incompatible blood transfusion (rare).
 - d. Obstructive jaundice.
5. Bone marrow changes:
 - Mongoloid face.
 - Bone ache.
6. Haemolytic crisis:
 - Fever - rigor - headache - dizziness.
 - Dark urine - bone ache.

Clinical pictures

- General examination :
 - ✓ Pallor / jaundice.
 - ✓ Pulse → hyperdynamic circulation.
 - ✓ Lower limb → leg ulcers.
- Abdominal examination :
 - ✓ H.S.M. or scar of splenectomy.
- Heart examination:
 - ✓ Hyperdynamic with haemic murmurs
 - ✓ D.D. with A.I.

Investigations and treatment

See written notes.

Generalized lymphadenopathy

Causes

1. Infective: bacterial (T.B.) - viral (viral hepatitis, IMN) - protozoal (toxoplasmosis, syphilis).
2. Haematological malignancy: leukemia (CLL) - lymphoma (Hodgkin's - lymphosarcoma).
3. Neoplastic: secondaries.
4. Infiltrative: amyloidosis.
5. Miscellaneous:
 - Collagen : SLE, Felty syndrome & Still's disease.
 - Sarcoidosis.
 - Serum sickness.
 - Grave's disease.
 - Drugs: phenytoin.

History

1. Onset: acute in leukemia, gradual in CLL.
2. Age: middle age in T.B. - old CLL - Hodgkin age 18 - 25 years, another peak at 60 - 70 y.
3. Fever: Pel Ebsstein in Hodgkin.
4. T.B.: toxemia, anti T.B., sanatorial tt, LN biopsy (+ sinus, scare).
5. Leukemia: bleeding & bony pain.

Lymph node examination

Using your middle 3 fingers, glands are rolled up & down, back & forward in a rotator movement.

1. **Cervical LN:** Waldeyer ring
 - Circular group: submental - submandibular - pre auricular - post auricular - occipital.
 - Vertical group: upper & lower deep cervical (under cover of sternomastoid).
2. **Supra-clavicular LN:** palpated in supra clavicular fossa.
 - Virchow's gland: left supra clavicular LN (suggestive of abdominal carcinoma).
 - Scalene LN: part of supra clavicular LN - they lie on scalenus anterior muscle.
3. **Axillary LN:** arm is abducted & supported on examiner forearm - these consists of :
 - Anterior group: behind pectoralis major.
 - Posterior group: on posterior wall of axilla.
 - Lateral group: along axillary vessels.
 - Medial group: on chest wall.
 - Apical group: in the apex of axilla.

4. **Supra "epi" trochlear:** little above medial epicondyle of humerus.
5. **para aortic LN:** umbilical & epigastric regions along lateral border of aorta.
6. **Mediastinal LN:** D'espine sign in chest.
7. **Inguinal LN:**
 - Superficial group (arranged transversely).
 - Deep group (arranged vertically along medial side of femoral vein).

Endocrinal Cases

- Thyrotoxicosis.
- Myxoedema.
- Acromegaly.
- Hypocortisism.
- Cushing.
- Addison.

History taking

General - gonadal - skin - gland swelling - specific.

General

A أرقام	<ul style="list-style-type: none"> • Temperature: intolerance to cold (myxoedema) - flushing (thyrotoxicosis). • ABP: history of hypertension (cushing - acromegaly - myxoedema). • Pulse: history of palpitation (thyrotoxicosis).
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B (Built)	1. Weight and appetite: cloths becoming looser or tighter			
	Weight		Appetite	Disease
		Increased	Decreased	Hypothyroidism
			Increased	Cushing's , hypothalamic syndrome, hypoglycemia.
		Decreased	Increased	Thyrotoxicosis, uncontrolled D.M.
			Decreased	Malignancy, Addison's, anorexia ± D.M.
	2. Height : tall as in gigantism.			

C (Colors)	<ul style="list-style-type: none"> • Vitiligo: auto immune disorder. • Pigmentation: Addison's disease, Cushing's syndrome. • Hypopigmentation: failure of tanning Sheehan.
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E حاجة فوق وحاجة تحت وحاجة في النص	<ul style="list-style-type: none"> • Head and neck: headache & blurring of vision: pituitary adenoma (acromegaly). • Upper limb. • Lower limb large (shoes size): acromegaly - swellings.
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F	<ul style="list-style-type: none"> • Face <ul style="list-style-type: none"> ✓ Moon: cushing. ✓ Coarse: acromegaly. • Mentality فخر <ul style="list-style-type: none"> ✓ Depression: cushing & acromegaly. ✓ Apathic: myxoedema.
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Gonadal

Ask about:

- Libido.
- Menstrual cycle.
- Importance.

Libido = sexual desire

- Cushing - Acromegaly: early increased then lost.
- Addison: loss of libido.

Skin and soft tissue changes:

Ask about skin changes.

Glandular swelling:

Ask about neck swelling.

Others:

Lethargy or fatigue: D.M., Cushing's hypoadrenalism, hypothyroidism, hypercalcemia.

Past history

Diseases	Operative	Drug history
<ul style="list-style-type: none"> • Gestational diabetes. • Hyper tension. 	<ul style="list-style-type: none"> • Any previous endocrinal surgery. 	<ul style="list-style-type: none"> • Hormonal: contraceptive pills - steroids. • Amiodarone. • Lithium. • Radio-iodine or antithyroid drugs.

Family history

- Type two diabetes.
- Related autoimmune disorders e.g. pernicious anemia, coeliac disease, vitiligo.

Examination**A. General examination**

As usual (A - F) + systemic review (CVS - lung - neurology - abdomen) + secondary sexual characters.

B. Local examination**1. Gonadal features:**

- Hypogonadism (loss of secondary sexual character)
- Sheehan: atrophy of breast, loss of libido, loss of hair & secondary amenorrhea.
- Myxoedema:
 - ✓ **Female:** atrophy of breast, loss of libido, loss of hair & menstrual disturbance (menorrhagia, galactorrhea or secondary amenorrhea).
 - ✓ **Male:** impotence, gynecomastia.

2. Skin and hair changes:

- Hypothyroidism: dry, coarse, pale, yellowish.
- Hyperthyroidism: moist hot, thyroid acropathy (clubbing and new digital bone), peritibial myxoedema.
- Hypoparathyroidism: dry, scaly skin.
- D.M.: Xanthelasma, ulceration, necrobiosis lipoidica diabetorum, bullosis.
- Acromegaly: soft tissue overgrowth with skin tags, acanthosis nigricans.

Hair distribution

- Hirsutism: Cushing's, acromegaly, PCO and virilizing tumors.
- In hypogonadism: loss of axillary and pubic hair in both sexes.

3. Gland examination:

- Abdominal examination for adrenal lesions.
- Thyroid gland examination (see later).

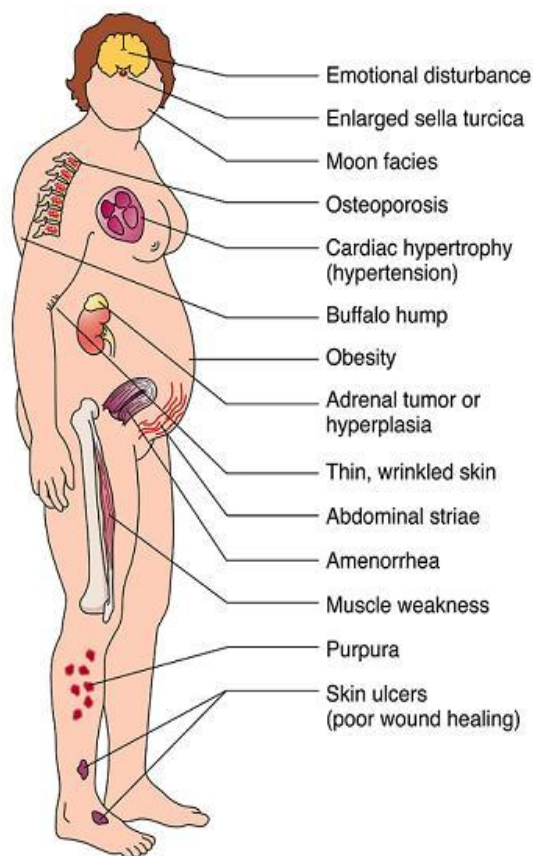
Cushing

Symptoms

- **A** أرقام : history of hypertension.
- **B (built)** : weight gain (mainly central).
- **C (color)** : pigmentation in pituitary cushing.
- **E**:
- **F**: change of appearance.
- **Gonadal**: amenorrhoea / oligomenorrhoea - poor libido.
- **Skin**: easy bruising - Hirsutism - acne.
- **Others**: depression - insomnia - muscular weakness - history of D.M.

Signs

1. **Vital signs**: hypertension.
2. **Head and neck**: depression / psychosis.
Cushinoid face:
moon face - plethora - acne - fish mouth - Hirsutism.
3. **Trunk**:
 - Buffalo hump.
 - Trunkal obesity.
 - Purpual striae.
 - Chest T.B.
4. **Limbs**
 - **Thin** : muscular atrophy.
 - **Osteoporosis**: bone ache ± pathological fracture).
 - **Oedema**: salt & water retention.
5. **Gonadal**.
6. **Skin**:
 - Easy bruising.
 - Hirsutism.
 - Acne.
 - Striae rubra then alba.
7. **Systemic review**:
 - **C.N.S.**: P.N. - visual field.
 - **Chest**: T.B.
 - **Heart**: hypertensive complications.
 - **Abdomen**: pot belly - stria - ++ liver (fatty).



Addison

Symptoms

- **A** أرقام : history of hypotension (crisis of shock, hospitalization and fluid replacement).
- **B (built)** : weight loss.
- **C (color)** : pigmentation.
- **E**:
- **F**: change of appearance.
- **Gonadal**: loss of libido.
- **Skin**: pigmented.
- **Others**: marked asthenia (features of hypoglycemia ???) - GIT upset - polyurea.

Signs

1. **Vital signs**: hypotension (systolic < 110).
2. **Head and neck**: depression - Exhaustion
face: pigmented.
3. **Trunk**: pigmented.
4. **Limbs**: weakness - pigmentation.
5. **Skin pigmentation**:
distribution
Mucous membrane
 - Buccal cavity.
 - Tongue (slate colored) (pathognomonic).Skin
 - Pigmented areas (areola).
 - Previous scar.
 - Umbilicus.
 - Friction areas: elbow.
 - Sun exposed area: neck & face.
6. **Systemic review**:
abdomen: tender renal angle (T.B.).

Acromegaly

Symptoms

- **A** **أرقام** : history of hypertension.
- **B (built)** : change in body shape (increased size of shoes).
- **C (color)** :
- **E**:
- **F**: Coarse features (use old photo).
- **Gonadal**: early increased libido then lost.
- **Skin**:
- **Others**: Headache + blurring of vision - history of D.M.

Signs

1. **Vital signs**: hypertension.
2. **Head and neck**: depression - psychosis.

Ape or coarse

bone

- big skull.
- Prominent bony processes.
- Prognathism with separated teeth (DD familial prognathism).

Soft tissue

- Hypertrophy of nose, ears, lips and tongue.
- Wrinkled skin, excess greasy sweating (activity).

3. **Trunk.**

4. **Limbs:**

- spade hands.
- large feet.

5. **Gonadal.**

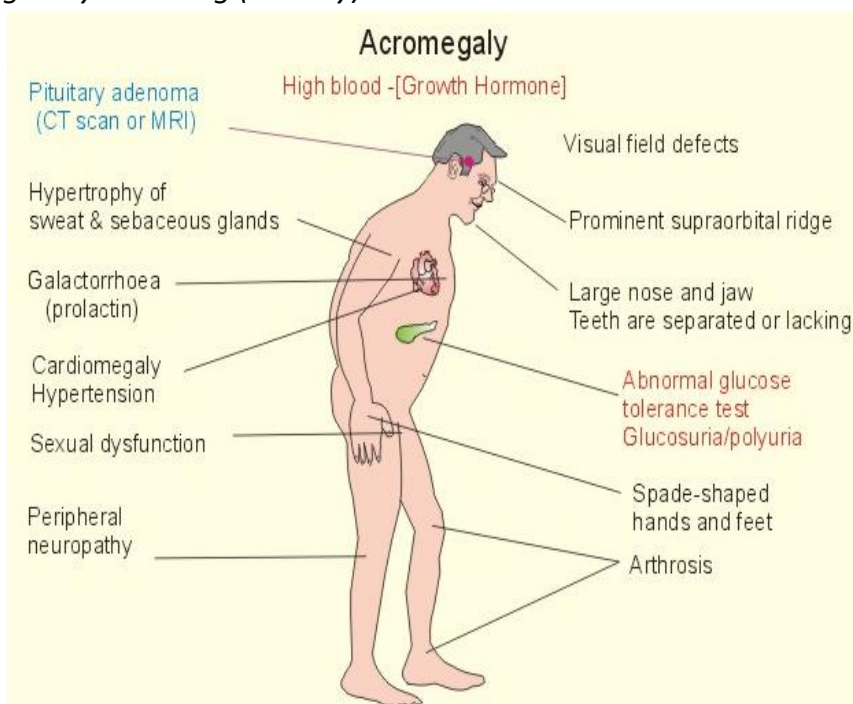
6. **Skin**: soft tissue over growth with skin tags, acanthosis nigricans.

7. **Systemic review:**

C.N.S.: P.N. ??? - visual field.

Heart: Heart failure (cardiomyopathy) - hypertensive complications.

Abdomen: visceromegaly.



Pan hypo-pituiterism (Simmond) (Sheehan)

Formed: **hypo-gonadism + hypothyroidism + hypocortisism.**

Symptoms

- **A** **أرقام**: history of hypotension (mild as aldosterone was not affected).
- **B (built)**: loss of weight.
- **C (color)**: De-pigmentation - failure of tanning.
- **E**:
- **F**: Myxedema face (use old photo).
- **Gonadal**: loss of secondary sexual characters (hypogonadism)
failure of lactation (**Sheehan**).
- **Skin**: de-pigmented skin mainly the darker areas as areola.
- **Others: History of post partum hemorrhage (Sheehan)** - fatigue - features of hypoglycemia.

Signs

1. **Vital signs**: hypotension.
2. **Head and neck**: depression - psychosis
myxedema face (see later).
3. **Trunk**.
4. **Limbs**.
5. **Gondal**: hypogonadism.
6. **Skin**: de-pigmented skin mainly the darker areas as areola.
7. **Systemic review (as myxedema)**
 - **C.N.S.**: P.N. - Carpal tunnel syndrome.
 - **Heart**: pericardial effusion - HB - HF (cardiomyopathy).

Hypothyroidism (Myxoedema)

Symptoms

- **A** أرقام: Cold intolerance - history of hypertension.
- **B (built)**: weight gain.
- **C (color)**: yellowish discoloration.
- **E**:
- **F**: slow celebration (myxedema madness).
bloated face (use old photo).
- **Gonadal**: Menorrhagia, galactorrhea or secondary amenorrhea.
- **Skin**: dry hair and skin
- **Gland**: thyroid swelling or mass.
- **Others**: Fatigue - confusion - weakness - constipation - dyspnea - deep voice.

Signs

1. **Vital signs**:
 - Hypothermia.
 - Hypertension.
 - Bradycardia.
2. **Head and neck**: slow celebration.
Myxedema face:
 - Expressionless, bloated & malar rash.
 - Loss of outer 1/3 of the eye brow, puffiness ± cataract.
 - Thick lips, red glazed tongue (macroglossia).
 - Yellowish skin without sclera icterus (carotenemia).
3. **Trunk**.
4. **Limbs**: myxoedematous oedema.
5. **Gonadal**:
Female: atrophy of breast, loss of libido, loss of hair & menstrual (menorrhagia, galactorrhea or 2nd amenorrhea).
Male: impotence - gynecomastia.
6. **Skin**: dry, cold, pale, yellow, scaly & rough - loss of hair, thin, brittle nails with longitudinal ridges. Hyperkeratosis of elbows and knees.
7. **Systemic review**:
 - **C.N.S.**: slow celebration - slurred speech - **suspended knee jerk** ± ataxia - P.N. - carpal tunnel syndrome.
 - **Heart**: pericardial effusion - HB - HF (cardiomyopathy).
 - **Abdomen**: ++ liver (fatty).
 - **Chest**: pleural effusion (cholesterol effusion).
 - **Abdomen**: hypoactive bowel sounds (ileus), myxedematous ascites.



Hyperthyroidism

Symptoms

- **A** أَرَقَام : fever - heat intolerance - palpitations.
- **B (built)** : weight loss in spite of increased appetite.
- **C (color)** :
- **E**:
- **F**: Starring look (see eye signs).
- **Gonadal**: secondary amenorrhea.
- **Skin**: moist soft skin with fine, silky hair texture.
- **Gland**: thyroid swelling or mass.
- **Others**: tremor - irritability - insomnia - proximal muscle weakness.

Signs

1. Vital signs:

- Wide pulse pressure.
- Tachycardia.
- Isolated S. hypertension.
- Hyperpyrexia.

2. Head and neck: irritability

Face

- Flush - moist - irritable - starring look.

Eye signs (see later).

3. Trunk .

4. Limbs:

- Fine tremors.
- Non-pitting pretibial edema (Grave's disease).

5. Gonadal.

6. Skin:

- Moist, warm, velvety.
- Palmar erythema.
- Fine silky hair.
- Pulmmer's nails (distal onycholysis).
- Clubbing of fingers and toes (acropachy).
- Loss of subcutaneous fat and muscle mass.

7. Systemic review:

Heart: tachycardia - irregularity as AF - systolic murmur (hyperkinetic).

C.N.S.: proximal muscle weakness - hyperreflexia - rapid speech - anxiety - tremors.

Thyroid gland: painless, diffusely enlarged thyroid without masses, thyroid thrill and bruit.

Examination of thyroid gland

The patient should be sitting upright.

Inspection

- A. **Look at the thyroid region.** (normally it is neither visible nor palpable).
1. Ask the patient to **swallow** (watch the neck swelling) the thyroid is attached to thyroid cartilage and will move up with swallowing.
 2. Also ask the patient to protrude his tongue and watch the neck swelling **thyroglossal cyst** will move upwards with protrusion of the tongue.
- B. **The rest of the neck for:** scars - JVP may be engorged in retrosternal goiter - redness in suppurative thyroiditis.

Palpation

Stand behind the patient and place a hand either side of their neck. The patient's neck should be slightly flexed to relax the sternomastoids.

1. Ask if there is any tenderness.
2. Place the middle 3 fingers of either hand along the midline of the neck.
3. Assess the size, shape, and mobility of any swelling.
4. Repeat the examination whilst the patient swallows.

Palpable thrill: may be present in active thyrotoxicosis.

percussion

- Percuss downwards from the sternal notch.
- In retrosternal enlargement the percussion note over the manubrio-sternum is dull as opposed to the normal resonance.

Auscultation

Apply the diaphragm of the stethoscope over each lobe of the thyroid gland and auscultate for a bruit. May be present in active thyrotoxicosis.

Pemberton's sign: a test for thoracic inlet obstruction (e.g. retrosternal goiter).

- Ask the patient to raise both arms above the head.
- Patients with inlet obstruction may develop signs of venous compression (facial plethora, cyanosis, dizziness, syncope).

Eye examination in thyroid disease

Inspection

- Look at the patient's eyes from the front, side, and from above.
- Ensure both eyes can close (failure is a medical emergency).

Findings:

- **Proptosis:** protrusion of the globes as a result of retro - orbital fat, oedema, and cellular infiltration. (move patient's head backward - cornea will be observed firstly).
- **Exophthalmos:** severe form of proptosis can develop corneal ulceration, chemosis, conjunctivitis.
- **Lid retraction (Dalrymple's sign) :** noticed as rim of sclera above the iris when the patient looks forwards (called Starring look). Caused by increased tone and spasm of elevator palpebrae superioris.

Eye Movements

Test eye movements in all directions

Findings:

- **Lid lag (Von Graefe's sign):** upper eyelid seems to lag behind the movement of the eye, allowing white sclera to be seen above the iris as the eye moves downward.

Visual fields

It is wise to perform a quick screening test of the visual fields.

How to examine exophthalmos

To show true or false

1. **Naffziger test:** to see the level supra and infra orbital ridge with cornea. واقف خلف المريض
2. **Frazer's test:** to see the obliteration of sulcus of orbital margin with slight closed eye. واقف بجانب المريض
3. **Ruler test:** to see the level of supra & infra orbital margin with cornea by a ruler. واقف بجانب المريض

To determine the degree

1. **Exophthalmometer.**
2. **Ruler:** to measure distance between lateral orbital & apex of cornea (normally = 15 - 17 m).

How to examine eye signs

1. **Stellwag's sign:** starring look or infrequent blinking .
2. **Von Graefe's sign:** upper eye lid lags behind when moving the eye downwards.
المقابر وكده تحت Grave
3. **Dalrymple's sign:** a rim of sclera is seen above the cornea when moveing the eye downwards.
4. **Joffroy's sign:** loss of wrinkling of the forehead when moving the eye upwards.
5. **Mobius sign:** lack of convergence on looking to near." Due to weak medial rectus muscle".

Diabetes Mellitus

Diabetes mellitus is characterized by hyperglycemia due to absolute insulin deficiency .

بنقسم ال Diabetes إلى :

- primary (ودا مجهول السبب)
- Secondary

- ال primary ده بيقسم إلى :

✓ Type one (مشكلته نقص الأنسولين سواءاً partial or complete)

✓ Type two (مشكلته insulin resistance) فبتلاقي الأنسولين هنا زيادة (والمشكلة في ال receptors)

Diabetic history

As with other diseases, you should establish when the diagnosis was made (and how) and the course and treatment of the disease. Additional questions relating to disease monitoring and diabetic complications that

you should ask patients with diabetes are as follows:

- When was it first diagnosed?
- How was it first diagnosed?
- How was it first managed?
- How is it managed now?
- If on insulin, when was that first started?
- Are they compliant with a diabetic diet?
- Are they compliant with their diabetic medication?
- How often do they check their blood sugar?
- What readings do they normally get (if possible, ask to see their monitoring booklet)?
- What is their latest Hb A 1 C (many will know this)?
- Have they ever been admitted to hospital with diabetic ketoacidosis (DKA)?
- Do they go to a podiatrist?
- Have they experienced any problems with their feet? Do they use any moisturizers or cream on their feet?
- Do they participate in a retinal screening program?
- Have they needed a referral to an ophthalmologist?
- In the newly diagnosed diabetic, ask about a history of weight loss (will differentiate type 1 and type 2 diabetes).

Diabetes may present with the classical triad of symptoms :

- Polyuria : due to osmotic diuresis caused by glycosuria.
- Thirst: due to the resulting loss of fluid and electrolytes.
- Weight loss : due to fluid depletion and breakdown of fat and muscle secondary to insulin deficiency.

Other common symptoms include tiredness, blurred vision (due to glucose-induced changes in lens refraction) and itching of the genitalia (pruritus vulvae in women or balanitis in men) due to candida yeast infection (thrush)

On Examination :

- There may be evidence of weight loss and dehydration.
- In diabetic ketoacidosis the breath may have the sweet smell of ketones.
- Skin infections with boils and abscess are common.
- Acanthosis nigricans (soft, velvety, brown skin) is a sign of hyperinsulinism and is seen frequently in the axillae and groins of patients with insulin-resistant type 2 diabetes.
- Necrobiosis lipodica, due to collagen degeneration, may occur on the shins of some patients with type 1 diabetes and often causes chronic ulceration.
- Diabetic foot ulceration which caused by multi factorial, including diabetic neuropathy, arterial insufficiency and increased susceptibility to infection.
- Xanthomata their presence indicates significant hyperlipidaemia.
- Lipohypertrophy at the site of insulin injection

Complications of Diabetes mellitus :

Microvascular / neuropathic

- Retinopathy, cataract : impaired vision.
- Autonomic neuropathy postural hypotension, vomiting, diarrhea.
- Nephropathy : protein loss, renal failure.
- Foot disease : ulceration, arthropathy
- Peripheral neuropathy : sensory loss, motor weakness.

Macrovascular

- Coronary circulation : myocardial ischaemia and infarction.
- Cerebral circulation : transient ischaemic attack (TIA), stroke.
- Peripheral circulation : claudication, gangrene and amputation.